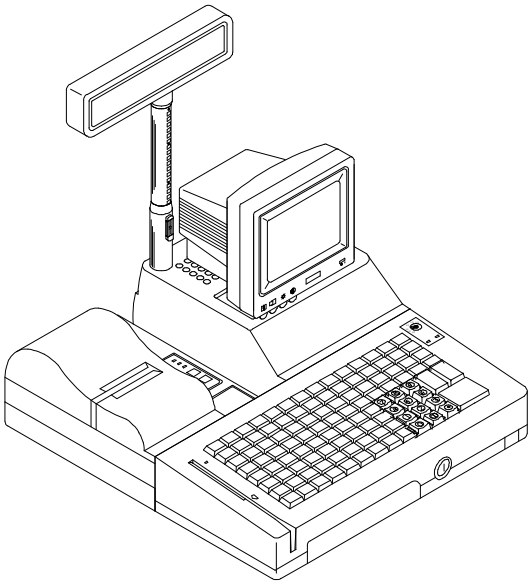
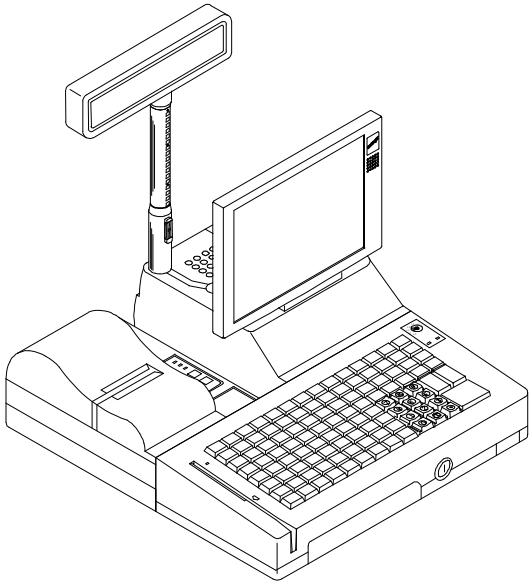
POSIFLEX™

PST-6000 SERIES

TECHNICAL MANUAL

Rev. : A





SOME IMPORTANT NOTES

FCC NOTES

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with limits for a Class A digital device pursuant to subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures to correct the interference.

WARRANTY LIMITS

Warranty will terminate automatically when the machine is opened by any person other than the authorized technicians. The user should consult his/her dealer for the problem happened. Warranty voids if the user does not follow the instructions in application of this merchandise. The manufacturer is by no means responsible for any damage or hazard caused by improper application.

ABOUT THIS MANUAL

This manual assists the user especially the software programmer who provides the software system for POS application to utilize the hardware of the PST6000 series which is a member of the POSIFLEX integrated point-of-sale terminal product family. The PST6000 is a compact point-of-sale system that gives the most user friendly upgrade transition from ECR and combines the performance and affordability of personal computers with the elegance and reliability of business machine. The PST6000 also provides the built-in networking capability for easy communication among multiple terminals in addition to the data transfer and control through back office server.

The manufacturer of the PST6000 series heartily apologizes to the user for reserving the right to change or to modify this manual without notice due to the rapid and constant progress and improvement on science and technology. The user may always obtain the most up to date information or software utilities through any of our web sites: ***http://www.posiflex.com.tw;***

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OVERVIEW

SCOPE

The PST6000 series is a series of fully integrated PC based point-of-sale terminals. This series provides the best performance for point-of-sale systems. This series also provides a powerful programmable keyboard with 112 key-sites of a comfortable size 18 x 22 mm in 8 x 14 matrix and a 6 position control key which is capable of sending answer back codes according to the position of the key.

FEATURES

- Highest security for business machine
- Greatest User's convenience and easiest software programming
- Highest profitability for end users
- Best compatibility and flexibility to any hardware / software application
- Highest performance in most compact size point-of-sale system
- Most cost effective with top quality, reliability and serviceability of point-of-sale system at reasonable price
- Powerful programming ability (hot key programming, programming under Windows, multiple page, multiple level, whole range key content, time delay, position sense answer back code covering most ECR functions, etc.)
- **Built-in UPS function** to support the system from intermittent power failure
- **Accidental power off protection** – only power on or software controlled power off function accessible from exterior of the system. This feature, together with the UPS function, provides a data-loss-free environment.
- **Various automatic power up** methods for unmanned information exchange
- **Power saving function** in compliance with PC97 ACPI and legacy PMU

MODEL NUMBERS

Customer Display / Operator (Cashier) Display	OPTIONAL CUSTOMER DISPLAY: PD-2101 or PD-7001 /PD7011 /PD7021
9” monochrome or 10” color CRT DISPLAY	PST6000
12.1” color DSTN LCD DISPLAY	PST6030

Note: The order for PST6000 will not automatically cover the monitor. The user should order for the 9” monochrome CRT or the 10” color CRT separately. The PST6000 itself is delivered without monitor display but with the monitor tilt/swivel base. However, the PST6030 is delivered with the 12” LCD panel together with its special base.

GENERAL SPECIFICATION

SYSTEM

- Meet PC97 requirement
- CPU speed : Pentium-100 or up
- 16 MB DRAM (expandable to 192 MB max. option)
- 2nd level cache memory: 256 KB (512 KB option)
- 3.5” FDD 1.44 MB
- Built-in IDE interface supports up to mode 4 and ultra DMA/33
- One half-length ISA expansion slot and two half length PCI expansion slots for the model with CRT display. One (PCI) slot will be occupied if the LCD display is used. However, there will be always two I/O windows occupied by the system.
- DCI Technology for best compatibility of input devices
- Non-volatile Static Random Access Memory 32KB (expandable to 64KB max. option)

POWER SOURCE

Item	Specification
High range of voltage input	180 ~ 264 Vac
Low range of voltage input	90 ~ 130 Vac
Input frequency	47 ~ 63 Hz

Total Power Consumption / Display used	Normal	Maximum
9” mono monitor	65 W	72 W
10” color monitor	120 W	130 W
12” color DSTN LCD	45 W	50 W

Note on power consumption measurement: measured without printer.

OPERATOR DISPLAY

CRT display (VGA interface) – for PST 6000

Display Type	9” monochrome CRT	10” color CRT
Size	228 mm (9”) diag.	175 (6.9”) * 125 (4.9”) mm
Resolution	800 * 600 max.	1024 * 768 max.
Position movable range	Back & forth: 48mm (1.890”) max. Left to right: 30mm (1.181”) max.	
Swivel range	90°left, 90°right	
Tilt angle	20°max.	
Power source (UPS supported)	Included in VGA display connector	AC input from output outlet of system power
Video memory	Shared from system memory, programmable through CMOS setup	

Note: 10” color monitor uses AC power and is not UPS supported.

12.1” COLOR LCD –for PST 6030

Display Type	Color DSTN –LCD
View area	247 (9.7”) (W) * 186 (7.3”) (H) mm
Resolution	800 * 600
Memory size	1 MB
Swivel range	45°left, 30°right
Tilt angle	90°max
Back light	Side-edge CFL * 2
Luminance	150 cd/m^2
Knob control	Brightness and Contrast
Signal interface	TTL
Signal connector	50 pin SCSI connector
Power source	included in display connector

LED COLOR

- POWER LED: green
- STANDBY INDICATOR: yellow
- MSR INDICATOR: dual color (green for good reading, red for invalid reading)

SYSTEM POWER ON/OFF CONTROL

- One main power ON/OFF push switch hidden inside front door area for direct drive on PSU
- One ON switch at right end of front edge of the system
- Any position (usually LP) of the 6 position lock can be programmed as the software shutdown control according to POSIFLEX standard

UPS SUPPORT (battery option)

- Supports system operation for 3~8 min. depending on loading condition of 24V printer and whether the UPS is fully charged
- STANDBY LED turned on when UPS stand-by at power on or AC power present during system off
- STANDBY LED flashes and system beeps when UPS starts working and discharging. Such flash and beep stop in 3 ~ 5 sec after AC power resumes stable

24VDC POWER SUPPLY TO POS PRINTER

- UPS supported
- 24 +/- 1.2 VDC at 2 AMP load
- Max. ripple + noise: 240 mV
- Accessory: cable CCBLA-146

INPUT / OUTPUT PORTS

- 1 X LAN port (Ethernet 10 base T and 100 base T)
- 4 X serial communication ports with COM1 capable of supporting 5 V DC while each of the rest capable of supplying both DC +5V and DC +12V at 1A. Default setting is no DC output for all ports.
- 1 X parallel port
- One independent control for a dedicated cash drawer (two cash drawers as option)
- 1 X VGA display port for PST 6000. 1 X LCD display port for PST6030. Both include UPS supported DC power
- 1 X 24 VDC / 2 Amp. Power supported by UPS function
- UPS connector for 2.3AH/12V Lead Acid battery or above
- 2 USB ports
- 1 fast IRDA port (IRDA transceiver option)
- 1 PS/2 mouse port (connector cable option)

HDD

- 1GB OR ABOVE

PRELOAD DOS

- MS-DOS 6.22 (preload WINDOWS 95 as option)

EXTERIOR

- DIMENSIONS:
  WIDTH: 408 mm (16.1”)
  DEPTH: 465 mm (18.0”)
  HEIGHT: 355 mm (14.0”) for LCD models (with 12” LCD)
  379 mm (14.9”) for CRT models (with 9” mono)
- WEIGHT
  12.5Kg for CRT models
  10.0Kg for LCD models

PROGRAMMABLE KEYBOARD

- Spill-proof construction
- Extension keyboard wedge connector
- Transparent key caps over key tops
- 6 position key switch control, with key extractable at L0 and L1
- Security Key lock function locks up whole keyboard port
- 5 pages of programmable key definitions defined by 6 position key switch
- 112 sites of fully programmable keys for each page
- 255 bytes max. can be programmed for each key
- Total memory for keys to be programmed: 8 KB
- Programmable under DOS, Windows 3.1, or Windows95 without TSR or DLL program
- Multi-page programming
- Multi - level programming
- Programmable output speed control
- Time - delay programming
- Hot key programming (teach & learn)
- Answer back signal when position key changed or when enquired.
- Standard layout includes one quad key, two double keys, 12 numeric keys 00 0~9 and 92 pieces of single keys. The single keys, double keys and quad keys are designed with correspondent transparent key caps. The numeric keys and the blank key are designed to be without key caps.

ENVIRONMENTAL

- Temperature range:
  Operating: 0°C ~ +40°C
  Non-operating: -20°C ~ +60°C
- Humidity range:
  Operating: 20%RH ~ 80%RH, non-condensing max. wet bulb 26°C
  Non-operating: 10%RH ~ 80%RH, non-condensing max. wet bulb 28.9°C

ACCESSORIES

- USER'S MANUAL: 1 COPY
- PST LEGEND SHEET IN 4 COLORS
- SOFTWARE DOCUMENTS FOR PRELOADED DOS ON HDD (NOT BUNDLED FOR DISKLESS MACHINE): 1 SET
- ELECTRONIC KEY FOR PROGRAMMABLE KEYBOARD : 4 PCS (1 SET)
- MECHANICAL KEY FOR FRONT DOOR: 2 PCS
- TRANSPARENT KEY CAPS:
  FOR SINGLE KEY: 92 PCS
  FOR DOUBLE KEY: 2 PCS
  FOR QUAD KEY: 1 PC
- KEY CLIP FOR REMOVAL OF KEY CAPS: 1 SET
- POWER CABLE FOR 24 V DC CCBLA-146: 1 PC
- CABLE FOR CASH DRAWER CONTROL (CCBLA-180 FOR CR-3100 / CR3200)
- POWER CORD
- CABLE TIE: 5 PCS
- VELCRO PATCHES FOR PRINTER INSTALLATION: 4 PCS
- DISKETTE FOR DRIVER UTILITY
- COM 1 TERMINATOR: 1 PC (MOUNTED ON MACHINE)
- VFD TERMINATOR: 1 PC (MOUNTED ON MACHINE)
- DUST COVER

OPTIONS

CUSTOMER DISPLAY

MODEL Number	PD2101	PD7001/PD7011.PD7021
Display Media	VFD	LCD
Number of rows	2	2 or 4
Characters per row	20	10 or 20 or 26
Character width (mm)	7.2	8.35 or 17.95
Character height (mm)	11.25	8.35 or 17.95
Character in dot matrix format	5 X 7	8 x 16, 16 x 16 or 6 x 8
Character color	Green (505 nm)	Dark blue
Horizontal slide (mm)	95	95
Horizontal rotation	360°	360°
Inclined viewing angle	14.5°and 30°	14.5°and 30°
Display area (mm x mm)	216 x 32	196 x 42.4

KEY TOP OPTION

- QUAD KEY
- DOUBLE KEY
- SINGLE KEY
- BLANK KEY

UPS BATTERY

- 2.3 AH/12V LEAD ACID BATTERY

INTERNAL MODEM CARD

- AFM100 – CUSTOMIZED SIZE TO FIT INTO THE SYSTEM – USING RJ11C FOR TELEPHONE CONNECTION

IRDA TRANSCEIVER

- PST055A+CCBLA-244

PS/2 MOUSE CONNECTOR CABLE

- CCBLA-233

PCMCIA CONTROL CARD

- PST060

CACHE MEMORY EXPANSION

- 512 KB

DRAM EXPANSION

- ON BOARD 2 SIMM SOCKETS FOR 4MB ea., 8MB ea. AND 16MB ea. EDO DRAM
- ON BOARD 2 DIMM SOCKETS FOR 16MB ea. EDO DRAM, 32MB ea. AND 64MB ea. SDRAM

PRINTER: PP-3000

- DOT MATRIX 9 PIN
- HIGH SPEED BI-DIRECTIONAL
- FRICTION TYPE
- 40 COLUMNS FOR 15.4 CPI
- ACCEPTS PAPER WIDTH 2.25/3/3.25 INCHES WITH ADJUSTABLE PAPER GUIDE
- PRINTS ON ORDINARY OR UP TO 3-FOLD CARBONLESS COPY PAPER

MAGNETIC STRIPE READER

Reader application

Applicable card type	ISO 7811	JIS X6302
Card feed method	Manual	Manual
Card feed direction	Bi-direction	Uni-direction
Card feed speed	5 ~ 55 IPS	100-1200mm/sec
Read / write function	Read only	Read only
Life of head	Approx. 300,000 passes	300,000 passes
Error rate	Less than 0.5%	Less than 0.1%
Available models	Tracks 1 & 2 or tracks 1, 2 & 3	JIS - II

Card data format

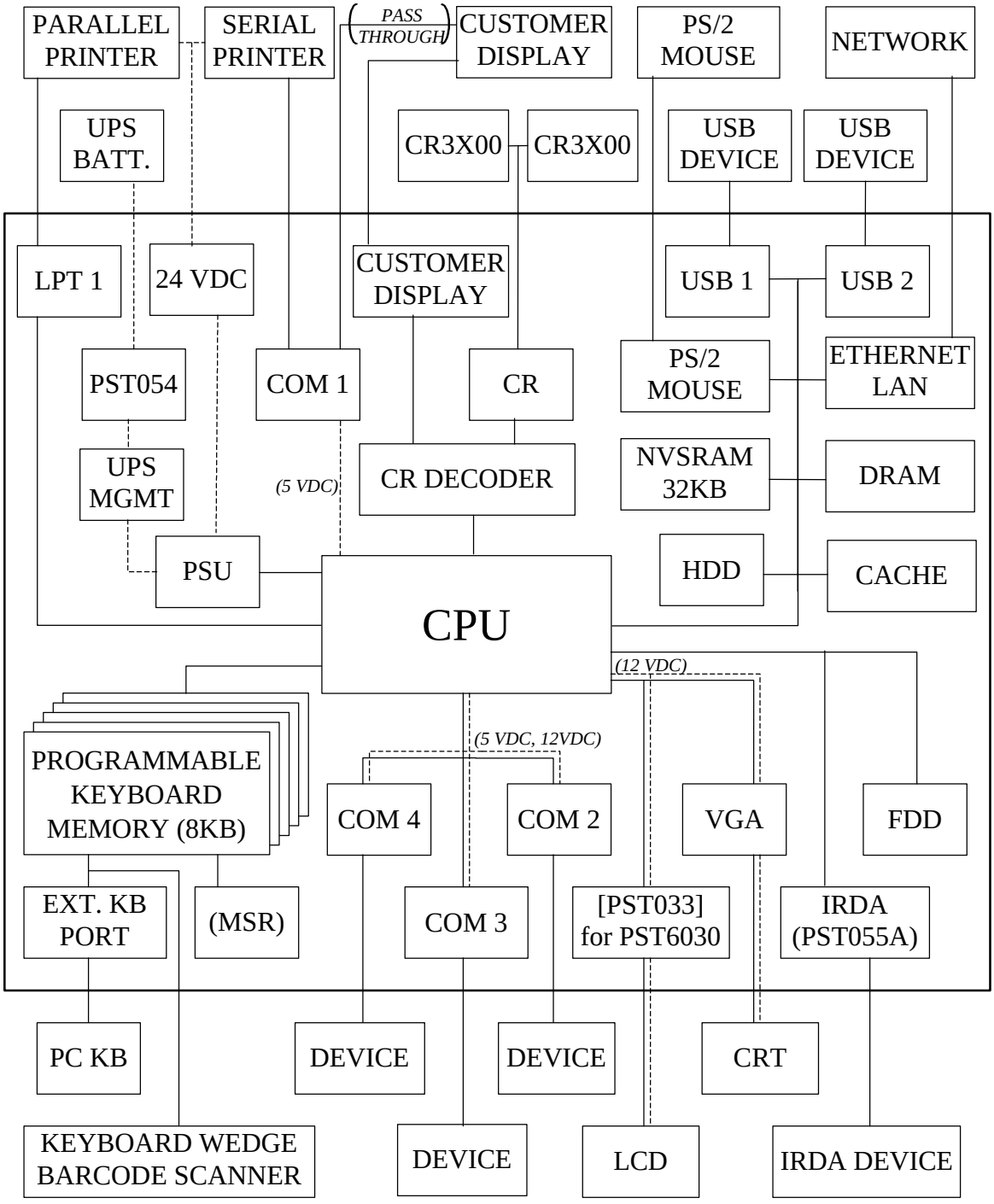
Card standard	IATA	ABA	THRIFT	JIS I	JIS - II
Track used	Track 1	Track 2	Track 3	Track 2	Rear side
Recording method	F^2F (FM)	F^2F (FM)	F^2F (FM)	F^2F (FM)	F^2F (FM)
Recording density	210 BPI	75 BPI	210 BPI	35 BPI	210 BPI
Recording capacity (characters / bits)	79 / 7	40 / 5	107 / 5	40 / 5	72 / 7

RELIABILITY SPECIFICATION

- POWER SUPPLY MTBF: 50,000 HRS
- MONITOR MTBF: 30,000 HRS
- LCD PANEL LIFE EXPECTANCY: 50,000 HRS
- LCD BACK LIGHT LIFE EXPECTANCY: 20,000 HRS
- FDD MTBF: 30,000 HRS
- HDD MTBF: 50,000 HRS
- NVSRAM DATA HOLD TIME: 10 YRS
- VFD LIFE EXPECTANCY: 30,000 HRS
- MSR LIFE EXPECTANCY: 300,000 PASSES
- KEY SWITCH LIFE EXPECTANCY: 10,000,000 STROKES
- 6 POSITION KEY LIFE EXPECTANCY: 25,000 TIMES

SYSTEM DEFINITIONS

BLOCK DIAGRAM



EXTERNAL KEYBOARD CONNECTOR

PIN ASSIGNMENT OF 5 PIN DIN FEMALE CONNECTOR:

PIN #	DEFINITION
1	CLOCK
2	KEYBOARD DATA
3	NC
4	GROUND
5	+5 VDC

LAN PORT

PIN ASSIGNMENT OF 8 PIN TELEPHONE JACK:

PIN #	DEFINITION
1	TD +
2	TD -
3	RD +
4	NC
5	NC
6	RD -
7	NC
8	NC

- **This port is defined as 100 base T or 10 base T LAN port.**
- **IRQ 10 is assigned for this port.**

PS/2 MOUSE

PIN ASSIGNMENT OF 6 PIN MINI DIN JACK:

PIN #	DEFINITION
1	PMDAT
2	NC
3	GND
4	VCC
5	PMCLK
6	NC

CRT DISPLAY PORT CONNECTOR

- **This port is available in PST6000**
- **DC +12 V is supplied to the monitor through specially designed different pins.**
- ★ **Short circuit will occur if any device other than the designated display is connected to the display port.**
- ★ **The DC supply in this connector is UPS supported.**

LCD DISPLAY PORT CONNECTOR

- **This port is available in PST6030**
- **DC +12 V is supplied to the LCD through specially designed different pins.**
- ★ **Permanent damage could occur if this connector is connected / disconnected while system power on.**
- ★ **Short circuit will occur if any device other than the designated display is connected to the display port.**
- ★ **The DC supply in this connector is UPS supported.**

SERIAL PORT COM1

PIN ASSIGNMENT OF 9 PIN D SUB MALE CONNECTOR:

PIN #	DEFINITION	ALTERNATIVE	DEFAULT SETTING
1	DCD	+12 VDC	DCD
2	RX		
3	TX		
4	DTR		
5	GND		
6	DSR		
7	RTS		
8	CTS		
9	RI	+5 VDC	RI

- **IRQ 4 is assigned for this port.**

- **COM 1 terminator must be installed when there is no device connected to COM1 port, otherwise the CR port and customer display will not function.**
- **It is definitely inadvisable to connect serial input devices to COM 1 port without thorough investigation. The reason is that some input devices like serial mouse do not provide standard RS232 hardware handshaking signals. In PST systems, both the customer display and cash drawer controller share the COM 1 port. When the system issues any command to cash drawer controller or the customer display, the hardware handshaking signal will be in error status and could halt this port if COM1 is not connected properly.**
- **DC supply of this port is UPS supported.**

Jumper selection: please refer to the description in Hardware details of this manual.

SERIAL PORT COM2

PIN ASSIGNMENT OF 9 PIN D SUB MALE CONNECTOR:

PIN #	DEFINITION	ALTERNATIVE	DEFAULT SETTING
1	DCD	+12 VDC	DCD
2	RX		
3	TX		
4	DTR		
5	GND		
6	DSR		
7	RTS		
8	CTS		
9	RI	+5 VDC	RI

- **IRQ 3 is assigned for this port.**
- **This port is suggested when a modem is to be connected.**
- **DC supply of this port is UPS supported.**

Jumper selection: please refer to the description in Hardware details of this manual.

SERIAL PORT COM3

PIN ASSIGNMENT OF 9 PIN D SUB MALE CONNECTOR:

PIN #	DEFINITION	ALTERNATIVE	DEFAULT SETTING
1	DCD	+12 VDC	DCD
2	RX		
3	TX		
4	DTR		
5	GND		
6	DSR		
7	RTS		
8	CTS		
9	RI	+5 VDC	RI

- **IRQ assigned: IRQ9**
- **DC supply of this port is UPS supported.**

Jumper selection: please refer to the description in Hardware details.

SERIAL PORT COM4

PIN ASSIGNMENT OF 9 PIN D SUB MALE CONNECTOR:

PIN #	DEFINITION	ALTERNATIVE	DEFAULT SETTING
1	DCD	+12 VDC	DCD
2	RX		
3	TX		
4	DTR		
5	GND		
6	DSR		
7	RTS		
8	CTS		
9	RI	+5 VDC	RI

- **IRQ assigned: IRQ5**
- **DC supply of this port is UPS supported.**

Jumper selection: please refer to the description in Hardware details.

PARALLEL PORT LPT1

PIN ASSIGNMENT OF 25 PIN D SUB FEMALE CONNECTOR:

PIN #	SPP MODE	EPP MODE	ECP MODE
1	- STROBE	-WRITE	-STROBE
2	D0	D0	D0
3	D1	D1	D1
4	D2	D2	D2
5	D3	D3	D3
6	D4	D4	D4
7	D5	D5	D5
8	D6	D6	D6
9	D7	D7	D7
10	- ACK	INTR	-ACK
11	BUSY	-WAIT	BUSY, PeriphAck
12	PE	NU	Perror, -AckReverse
13	SLCT	NU	SLCT
14	- AUTO FEED	-Datastb	-AutoFeed, HostAck
15	- ERROR	NU	-Fault, -PeriphRequest
16	- INIT	NU	-Init, -ReverseRequest
17	- SLCT IN	NU	- SLCT IN
18	GND	GND	GND
19	GND	GND	GND
20	GND	GND	GND
21	GND	GND	GND
22	GND	GND	GND
23	GND	GND	GND
24	GND	GND	GND
25	GND	GND	GND

- **IRQ 7 is assigned for this port.**

CUSTOMER DISPLAY CONNECTOR

- **This port uses COM 1 of the system and data can be passed through to COM 1 connector when proper command is received.**
- **The VFD terminator must be installed when there is no customer display connected to this connector, otherwise the COM1 port and the CR controller will not function properly.**
- **DC supply to this device is UPS supported.**

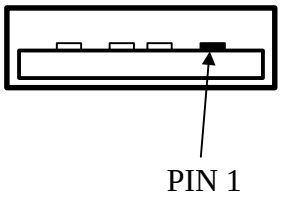
CASH DRAWER CONTROLLER

- **The cash drawer solenoid input is a 200 msec. grounding signal.**
- **The power to cash drawer solenoid is DC 12 V nominal.**
- **The command to open cash drawers is decoded through COM 1.**
- **The drawer open indication can be detected by software through status check on RI signal of COM 1.**

USB1

PIN ASSIGNMENT OF 4 PIN JACK:

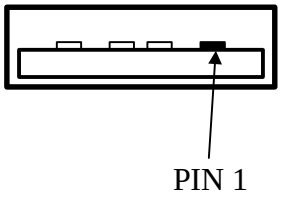
PIN #	DEFINITION
1	VCC
2	-DATA
3	+DATA
4	GND



USB2

PIN ASSIGNMENT OF 4 PIN JACK:

PIN #	DEFINITION
1	VCC
2	-DATA
3	+DATA
4	GND

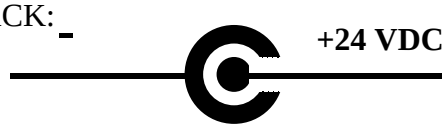


24 VDC CONNECTOR

DC supply of this connector is UPS supported.

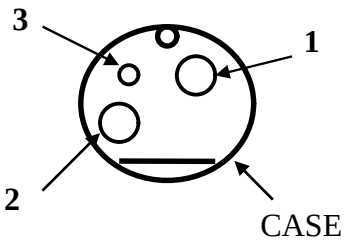
PIN ASSIGNMENT OF 3.5ϕ DC JACK:

PIN #	DEFINITION
CENTER	+24 VDC
OUTER	**GND**



PIN ASSIGNMENT OF 3 PIN PLUG TO PRINTER:

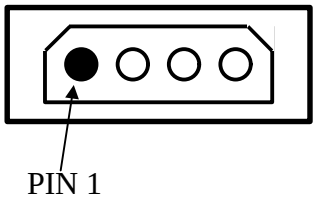
PIN #	DEFINITION
1	+24 V
2	GND
3	N.C.
CASE	CHASSIS GND



UPS BATTERY CONNECTOR

PIN ASSIGNMENT OF 4 PIN SOCKET:

PIN #	DEFINITION
1	+12 V
2	+12 V
3	GND
4	GND



APPLICATION GUIDES

OPERATOR DISPLAY

CRT MONITOR (FOR PST6000)

The CRT monitor used in PST6000 (VGA port built in on board) can be considered as ordinary PC VGA monitor in application concern. However, the power to the 9” VGA monochrome monitor is supplied through the VGA connector and is UPS supported. Yet, when the monitor used is the 10” color monitor, the AC power is used and is not supported by the UPS function.

LCD DISPLAY (12.1” COLOR DSTN)

As this LCD is constructed in 800 x 600 pallets, it is recommended to select 800 x 600 resolution for best vision.

CASH DRAWER

The software command to open the cash drawer or the first cash drawer with the optional split cable CCBLA-238 is a hexadecimal code of <07> sent to COM1 port under the protocol of 9600bps, none parity, 8 data bits, 1 stop bit.

The software command to open the second cash drawer with the optional split cable CCBLA-238 is a hexadecimal code of <17> sent to COM1 port under the same protocol as above.

The drawer open status can be obtained through checking the communication status of COM1 at signal RI. When there is no drawer open, the RI signal of COM1 is always set. When there is any cash drawer opened, the RI signal of COM1 is reset. The RI signal is obtained as the bit 6 (the second most significant bit) of the I/O address 3Feh if the COM1 address is set to 3F8h~3FFh (conventional address for COM1) in system configuration.

NVSRAM

The NVSRAM in a PST6000 system is installed in the mainboard of the PST system. The basic model of the NVSRAM in a PST system has a memory size of 32 KB and addressed from D0000h to D7FFFh in the memory map. The expanded version of the NVSRAM in the PST system has a memory size of 64 KB and occupies the memory address from D0000h to DFFFFh. This arrangement gives a great deal of easiness to a software programmer in utilizing the NVSRAM through direct software control in the application program in consideration of the hardware upgrading. One easiest way to utilize the NVSRAM of a PST system is through the use of the attached software driver to simulate a disk drive.

To have the NVSRAM work as a simulated disk drive, the user should first simply copy the NDISK.SYS file from the diskette attached to a convenient directory of his/her Hard Disk Drive, say copy the file NDISK.SYS to the subdirectory C:\PATH where PATH means the subdirectory routing required, add following sentence into the CONFIG.SYS file:

DEVICE = C:\PATH \ NDISK.SYS or
DEVICEHIGH = C:\PATH \ NDISK.SYS

and then restart the system. This will give a simulated free disk space of 28,160 bytes.

For the expanded NVSRAM option, the above sentence should be changed into:

DEVICE = C:\PATH \ NDISK.SYS /S64 or
DEVICEHIGH = C:\PATH \ NDISK.SYS /S64

This option gives a simulated free disk space of 60,928 bytes after restart of the system. The NVSRAM will then work as a simulated disk drive D: which works not only faster than a hard disk drive but also more reliable and safer especially in case of power failure.

CUSTOMER DISPLAY

In the following sections, it is assumed that before any command / data given to the customer display, the PST system should have been previously prepared for issuing command to the customer display unit through the following command given under DOS environment:

C:\> mode com1 96,n,8,1 (enter)

In other words, the protocols in RS-232C communication are listed below:

Serial Port Used	COM 1
Baud Rate	9600 bps
Parity Check	none
Date Bits	8
Stop Bits	1

As for the data displayed, please refer to the appendix of this manual. The 5 x 7 fonts used in PD-2101 page 0, PD-2101 page 1, PD-2101 EPSON emulation page 0 and PD-2101 EPSON emulation page 1 describe PD2101. The 8 x 16 fonts used in PD-7001 page 0, PD-7001 page 1 and international character sets describe PD7001. However, the simplified Chinese characters in PD7011 and the traditional Chinese characters in PD7021 are not listed.

The hardware handshaking signal of the customer display is defaulted to use CTS signal. For PST6000 series of system version C introduced in 2nd quarter of 1998 onward, this handshaking signal is selectable between CTS and DSR through change of jumper setting according to the description in hardware details.

PD-2101 (VFD DISPLAY)

This customer display provides 4 emulation modes for software programming in controlling the display. The emulation mode is defined by adjusting the DIP SW on the back. See Fig. D-1.

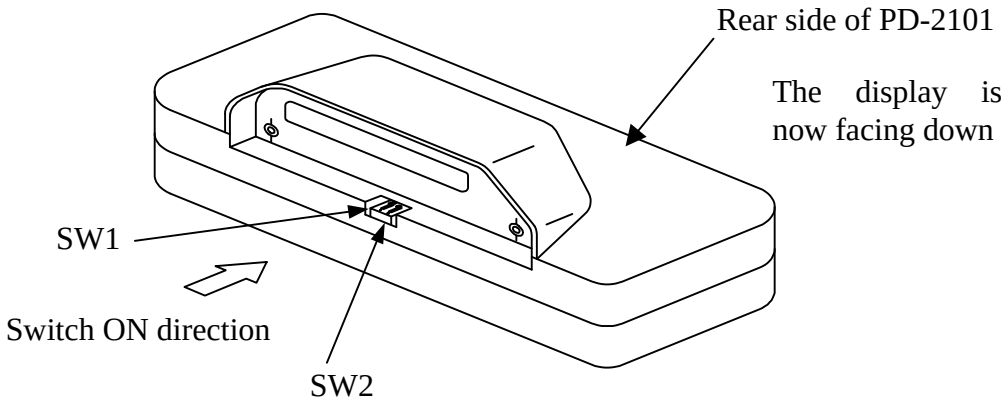
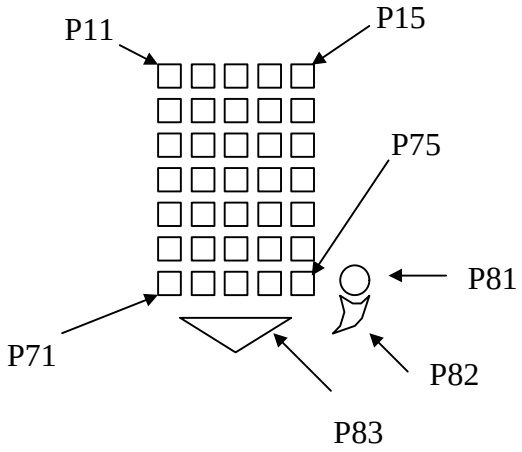


Fig. D - 1 DIP switch position

The relationship between the switch position and the emulation mode is summarized in the following table. However, the switching should only take place at power off.

Emulation Mode	**Futaba**	**Noritake**	**Aedex** (PD2101)	**ADM** (PD2101ADM)	**Epson**
SW 1	on	off	on	on	off
SW 2	on	on	off	off	off

On the VFD, there are totally at most 40 characters in 2 rows to be displayed at the same time, while each character displayed in the format of 5 by 7 rectangular dot matrix. To the lower right corner of each dot matrix there are a round shaped dot and a tail to form period and comma marks. For the characters in 2nd row of the VFD, there is one more feature to be displayed, which is the downward pointing triangle under each character. This triangular mark shall be referred to as the under mark for identification later on.



As illustrated in the above drawing, each rectangular dot in the font format shall be identified as P11, P12, …, P15, P21, P22, …, P25, P31, …, P35, …, P71, …, P75, P81, P82, P83. Where "Pn1" means the leftmost dot in the n^{th} row of the dot matrix and "Pn5" stands for the rightmost dot in the n^{th} row. P81 means the round dot to the lower right corner, P82 notifies the tail to form a comma and P83 denotes the under mark. These notations will be used in user defined fonts.

Futaba emulation mode

Command Name	**Hex Codes**	**Command Name**	**Hex Codes**
Reset	1F	Cursor on	13
Brightness control	04 bb	Cursor off	14
Change font page	1E 0p	(Horizontal tab.)	09
Moving sign	05 …… 0D	(Line feed)	0A
Change leading code	06 x1 x2	Horizontal tab	11 09
Set pass through flag	01	Vertical scroll up	12 09
Clear pass through flag	x1 x2 02	Cursor up/down	11 0A
Digit select	10 pp	Line feed	12 0A
Back space	08	Carriage return	0D

Noritake emulation mode

Command Name	Hex Codes	Command Name	Hex Codes
Reset	1B 49	Cursor on	15
Clear	0E	Cursor off	16
Moving sign	05 …… 0D	Back space	08
Change leading code	06 x1 x2	(Horizontal tab)	09
Set pass through flag	01	(Line feed)	0A
Clear pass through flag	x1 x2 02	Horizontal tab	11 09
Change font page	1E 0p	Vertical scroll up	12 09
Brightness control	1B 4C bb	Cursor up/down	11 0A
Digit select	1B 48 pp	Line feed	12 0A
Cursor blinking Rate	1B 54 nn	Form feed	0C
User defined graphics / fonts	1B 43 ad x1 ~ x5	Carriage return	0D

Aedex emulation mode (not for PD2101ADM)

Attention code + Function code + Data + Carriage return

Function Code	Command Name	Function Area	Data Length
1	Display top	Top row	Max. 20 characters
2	Display bottom	Bottom row	Max. 20 characters
4	On going scroll	Top row	Max. 60 characters
6	One time scroll	Top row	Max. 60 characters
7	Stop trapping	N.A.	No characters
8	Change attention code	N.A.	2 characters
9	Display whole area	Both rows	Max. 40 characters

Epson emulation mode (power on default)

Command Name	Command & Hex Codes	Command Name	Command & Hex Codes
Move cursor left	**BS** 08	Clear display screen	**CLR** 0C
Move cursor right	**HT** 09	Clear cursor line	**CAN** 18
Move cursor down	**LF** 0A	Specify overwrite mode	**US MD1** 1F 01
Move cursor up	**US LF** 1F 0A	Specify vertical scroll mode	**US MD2** 1F 02
Move cursor home position	**HOM** 0B	Specify horizontal scroll mode	**US MD3** 1F 03
Move cursor to bottom position	**US B** 1F 42	Set/cancel display screen blinking	**US E** 1F 45
Move cursor to leftmost position	**CR** 0D	Brightness adjustment	**US X** 1F 58
Move cursor to rightmost position	**US CR** 1F 0D	Set & display counter (time)	**US T** 1F 54
Move cursor to specified position	**US $** 1F 24	Display counter (time)	**US U** 1F 55
Set/cancel user defined characters ★	**ESC %** 1B 25	Initialize display	**ESC @** 1B 40
Define user defined characters ★	**ESC &** 1B 26	Show firmware version	**US @** 1F 40
Delete user defined characters ★	**ESC ?** 1B 3F	Select peripheral device	**ESC =** 1B 3D
Select character code table	**ESC t** 1B 74		

The commands with ★ mark may not be 100% compatible with original EPSON commands.

ADM emulation mode (for PD2101ADM only)

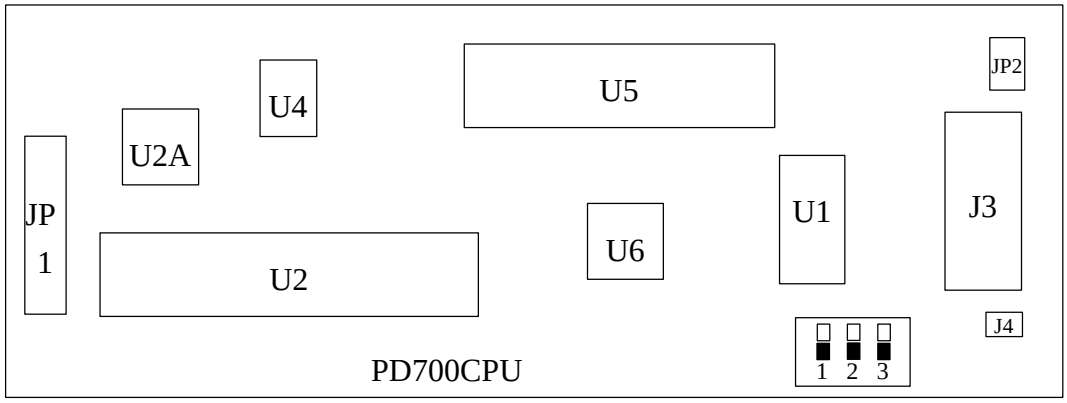
Control code [+ Data / Line #] [+ Carriage return]

Control Code	Command Name	Function Area
<0C>h	Clear Display	Line 1 +Line 2
<0D>h	Carriage Return	End of Command
<0E>h	Write Line 1	Line 1
<0F>h	Write Line 2	Line 2
<10>h	Write Decimal Point	Line 1
<11>h	Blink Line	Line 1 or Line 2
<12>h	Clear Blink	Line 1 or Line 2
<1E>h	Write Field 1	Left 8 characters of Line 2
<1F>h	Write Field 2	Right 8 characters of Line 2

PD-7001 (LCD DISPLAY)

NOTE : CARE SHOULD BE TAKEN NOT TO SEND ANY UNDEFINED CONTROL OR COMMAND CODES TO THE DISPLAY MODULE AS THIS MAY CAUSE A SOFTWARE MALFUNCTION OR EVEN SHUTDOWN OF THIS CUSTOMER DISPLAY.

SWITCH SETTINGS ON CONTROL BOARD



SW1 & SW2 for power on default emulation mode

SW1 \ SW2	OFF	ON
OFF	EPSON 2 X 20	NORITAKE 2 X 20
ON	EPSON 4 X 26	N.A. (see NOTE)

	OFF	ON
SW3	NO LOGO AT POWER-ON	SHOW LOGO AT POWER-ON
J4	N.A.	Default

NOTE: The switch position to have both SW1 and SW2 ON is absolutely forbidden in PD7001. This combination is reserved for PD7011/PD7021 that uses second CPU for complicated font handling.

EPSON MODE -- 2 LINES X 20 CHARACTERS

Command	Name	Code
BS	Move cursor left	<08>h
HT	Move cursor right	<09>h
LF	Move cursor down	<0A>h
HOM	+ Move cursor to home position	<0B>h
CLR	+ Clear display screen	<0C>h
CR	Move cursor to left-most position	<0D>h
CAN	Clear cursor line	<18>h
ESC %	Set/cancel user-defined character set	<1B>h <25>h <n> n = 1 : set n = 0 : cancel
ESC &	Define user-defined character (* Max. 3 characters * multiple definition in 1 command * every time new define command will overlay old definition from the first character) (ref. 4.4 for x1 to x16)	<1B>h <26>h <s> <n> <m> [<a> <x1> <x2> … … <x16>]m-n+1 where: s = 2 , a = 8, n = starting address, m = ending address
ESC =	Select peripheral device: n = 1 -> pass through selected + n = 2 -> display selected n = 3 -> pass through / display both selected Reset display mode: n = 10-> Epson 2x20 mode n = 20-> Noritake 2x20 mode n = 40-> Epson 4x26 mode n = 80-> (must not be used)	<1B>h <3D>h <n>h
ESC ?	Delete user-defined character	<1B>h <3F>h <n>
ESC @	Initial display	<1B>h <40>h

EPSON MODE -- 2 LINES X 20 CHARACTERS (CONTINUED)

Command	Name	Code
ESC C	Select cursor	<1B>h <43>h <n> n = 0 : cursor invisible + n = 1 : cursor visible
ESC R	Select international character set	<1B>h <52>h
ESC t	Select character code table	<1B>h <74>h <n> + n = 0 : page 0 selected n = 1 : page 1 selected
US MD1	+ Specify overwrite mode	<1F>h <01>h
US MD2	Specify vertical scroll mode	<1F>h <02>h
US MD3	Specify horizontal scroll mode	<1F>h <03>h
US LF	Move cursor up	<1F>h <0A>h
US CR	Move cursor to the right-most position	<1F>h <0D>h
US $	Move cursor to the specified position	<1F>h <24>h <n> <m> <n>th column <m>th line
US :	Set start/ending position of macro definition max. 60 byte commands (Macro definition and user- defined characters can not exist at the same time)	<1F>h <3A>h
US @	Execute self-test (* show version, * show overwrite, vertical/ horizontal scroll modes, * show all characters of current code table)	<1F>h <40>h
US B	Move cursor to bottom position	<1F>h <42>h
US E	Blink display screen	<1F>h <45>h <n> n x 50 ms = on/off time n = 0, display keep on n = 255, display keep off
US ^	Execute macro	<1F>h <5E>h <n> <m> n x 20 ms = interval of bytes m x 50 ms = interval of macros

+ Display automatically default to these conditions after power-on or reset

NORITAKE MODE -- 2 LINES X 20 CHARACTERS

COMMAND	DESCRIPTION (limitations)
<08>	Back Space: This command moves the cursor to the left digit. If the current position is the most significant digit (MSD) of the 2nd row, the cursor will move to the least significant digit (LSD) of first row. If the current position is the MSD of the first row, the cursor will not move.
<11> <09>	Horizontal Tab: This command moves the cursor one digit to the right. If the current position is the LSD of the 1st row, the cursor will move to the MSD of the 2nd row. If the current position is the LSD of the 2nd row, the cursor will move to MSD the 1st row.
<12> <09>	Vertical Scroll Up: After writing as character to the LSD of the 2nd row, all 2nd characters are transferred to the 1st row, leaving a blank line on the 2nd row. The new cursor position is at the MSD of the 2nd row. If the cursor is not at LSD of the 2nd row, this command only moves the cursor to the next digit on the right.
<11> <0A>	Cursor Up/Down: Cursor moves up or down to another row.
<12> <0A>	Line Feed: If the cursor is at the 2nd row, all characters in the 2nd row will be transferred to the 1st row, and leave a blank 2nd row. The cursor position is unchanged. If the cursor is at the 1st row, it simply moves directly down to the 2nd row. Characters are not effected.

NORITAKE MODE -- 2 LINES X 20 CHARACTERS (CONTINUED 1)

COMMAND	DESCRIPTION (limitations)
<0D>	Carriage Return: Cursor moves to the current row's MSD position.
<0C>	Form Feed: Cursor move to the MSD of the 1st row.
<1B> <48> <P>	Digit Select: Move cursor to position P, where P is the digit position in hex number. For example. P=00 1st row MSD P=01 1st row 2nd digit P=13 1st row LSD P=14 2nd row MSD P=27 2nd row LSD
<15>	Cursor On: Cursor On or lighted.
<16>	Cursor Off: Cursor off.
<1B> <49>	Reset: All characters erased and all settings returned to power-on reset conditions.
<0E>	Clear: All displayed characters are cleared. Cursor stays at the same position.
<05>	Moving Sign Enables a scrolling message to be sent to the display. The string characters can be up to 45 characters long and terminated by <0D>. The message will scroll on the first row. It is disabled automatically when other information is sent.

NORITAKE MODE -- 2 LINES X 20 CHARACTERS (CONTINUED 2)

COMMAND	DESCRIPTION (limitations)
<1E><P>	Change font page + P = 0: page 0 selected P = 1: page 1 selected
<01>	Set Pass-through Flag Serial Pass-through and Parallel Pass-through pole displays only. Enables the pass- function. All data following the setting of this flag will pass-through the pole display and go to another peripheral device.
<21> <23> <02>	Clear Pass-through flag Serial Pass-through and Parallel Pass-through pole displays only. Disables or clears the pass-through function. (Two leading codes are programmable)
<06>	Change leading code The two leading code followed the command will replace the default leading code <21> and <23>.
<1B> <43> <Addr> <x1> <x2> … <x16>	User Defined Graphics/Fonts: <Addr> specifies the address where the user defined graphics/font to be stored. <x1>.....<x16> are the 16 bytes defining the dots of the 8 x 16 matrix to be turned on in the user defined character (ref. 4.4). Recommended <Addr>= A0 through FF, and no more than 3 user defined graphics/fonts.
<1B> <3D> <n>	Reset display mode n = 10-> Epson 2 x 20 mode n = 20-> Noritake 2 x 20 mode n = 40-> Epson 4 x 26 mode n = 80-> (must not be used)

EPSON MODE -- 4 LINES X 26 CHARACTERS

Command	Name	Code
BS	Move cursor left	<08>h
HT	Move cursor right	<09>h
LF	Move cursor down	<0A>h
HOM	+ Move cursor to home position	<0B>h
CLR	+ Clear display screen	<0C>h
CR	Move cursor to left-most position	<0D>h
CAN	Clear cursor line	<18>h
ESC %	Set/cancel user-defined character set	<1B>h <25>h <n> n = 1 : set n = 0 : cancel
ESC &	Define user-defined character (* Max. 3 characters * multiple characters can be defined in 1 command sets * every time new define command execution will overwrite the old definition from the first character)	<1B>h <26>h <s> <n> <m> [<a> <x1> <x2> … … <x8>]m-n+1 s = 1 , a = 5, n = starting character, m = ending character (ref. 4.4 for x1 to x8)
ESC =	Select peripheral device n = 1 -> pass through selected + n = 2 -> display selected n = 3 -> pass through/display both selected Reset display mode n = 10-> Epson 2x20 mode n = 20-> Noritake 2x20 mode n = 40-> Epson 4x26 mode n = 80-> (must not be used)	<1B>h <3D>h <n>h
ESC ?	Delete user-defined character	<1B>h <3F>h <n>h
ESC @	Initial display	<1B>h <40>h

EPSON MODE -- 4 LINES X 26 CHARACTERS (CONTINUED)

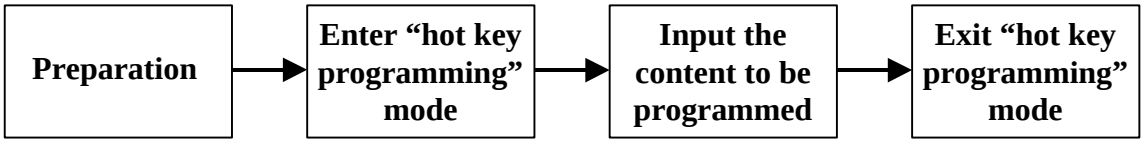
Command	Name	Code
ESC C	Select cursor	<1B>h <43>h <n> n = 0 : cursor invisible + n = 1 : cursor visible
ESC R	Select international character set	<1B>h <52>h
ESC t	Select character code table	<1B>h <74>h <n>h + n = 0 : page 0 selected n = 1 : page 1 selected
US MD1	+ Specify overwrite mode	<1F>h <01>h
US MD2	Specify vertical scroll mode	<1F>h <02>h
US MD3	Specify horizontal scroll mode	<1F>h <03>h
US LF	Move cursor up	<1F>h <0A>h
US CR	Move cursor to the right-most position	<1F>h <0D>h
US $	Move cursor to the specified position	<1F>h <24>h <n> <m> where: <n>th column <m>th line
US @	Execute self-test (* show version * show overwrite, vertical/ horizontal scroll modes * show all characters of current code table)	<1F>h <40>h
US B	Move cursor to bottom position	<1F>h <42>h
US E	Blink display screen	<1F>h <45>h <n> n x 50 ms = on/off time n = 0, display keep on n = 255, display keep off

+ Display automatically default to these conditions after power-on or reset

PROGRAMMABLE KEYBOARD

HOT KEY PROGRAMMING

The POSIFLEX programmable keyboard supports the “Hot key programming” method which is most useful in instant modification of a few keys in a preprogrammed keyboard without entering the more sophisticated programming utility. Of course, the user may also use this feature to program through out all 112 keys by 5 pages (LP and L1 to L4) at will. The whole process of “Hot key programming” contains 4 steps for each key to be programmed and is illustrated as following:



PREPARATION

Please connect a standard PC or PS-2 keyboard to the external keyboard port and settle the software and the rest hardware exactly the way application program requires before entering “Hot key programming” mode. The user shall then decide which key of which page is to be programmed and turn the 6 position control key to the proper position before entering the “Hot key programming” mode. Please note that the answer back codes of the position control key is not covered by the “Hot key programming” feature.

ENTER “HOT KEY PROGRAMMING” MODE

To enter the “Hot key programming” mode, the user must input the “Hot key” and identify the key on the programmable keyboard to be programmed. The so called “Hot key” is a special combination of keys pressed on the standard PC or PS-2 keyboard. In PST programmable keyboard, the “Hot key” is defined as pressing and holding the **left** “Alt” key while pressing the “PRT SC” (“Print Screen”) key on the PC or PS-2 keyboard. And by doing so, the programmable keyboard will give 2 beeps to notify that it is ready to receive the identification of which key to be programmed.

Right after the “Hot key” is released, the user shall press the key to be programmed on the programmable keyboard once to identify which key to be programmed. If the “Hot key” is pressed for the second time or the “Esc” key is pressed prior to the press of the key on the programmable keyboard, this mode will be aborted immediately. The user should not enter the “Hot key programming” mode when the programmable keyboard is already fully loaded (no more free memory for further programming) by the key contents previously programmed.

INPUT THE CONTENT TO BE PROGRAMMED

Once the programmable keyboard enters the “Hot key programming” mode with the key to be programmed identified, what the user types on the standard PC or PS-2 keyboard will be taken for the content to be programmed into that key of the programmable keyboard till the user exits the “Hot key programming” mode.

The legal input in this mode includes all alphabetical letters (including both upper and lower cases), numerical digits (applicable only for keys at the area above the alphabetical keys and excluding those on the numerical keypad), symbols (such as `!”#$ and those keys excluding arithmetic signs in the numerical keypad) and the “Enter” key. The “Shift” key, the “Caps lock” key and the “Back space” key are also accepted in this mode to serve an editing purpose (for example, pressing “Back space” will erase the last character of the input instead of being treated as a character for input). Pressing the “Esc” key in this mode will abort the “Hot key programming” mode immediately. All the rest keys (such as the “Ctrl”, “Alt”, “Home”, any function key or arrow key or any key in the numerical keypad) on the standard PC or PS-2 keyboard are illegal inputs in this mode. The maximum number of key presses acceptable to any key by “Hot key programming” is 32.

All the input from the standard PC or PS-2 keyboard in this mode will also be sent to the host computer.

EXIT “HOT KEY PROGRAMMING” MODE

After the intended content of the key is completely entered, the user shall press the “Hot key” again to notify the end of “Hot key programming”. The programmable keyboard will give one beep to signify the normal exit of the “Hot key programming” mode. Should there be any illegal entry in the content of the key or any other improper

operation during the programming, the programmable keyboard will give three beeps to signify the failure of “Hot key programming” and the key content is not changed. If the user pressed the “Esc” key to abort “Hot key programming”, the programmable keyboard will also give three beeps immediately as a response to signify the abort.

COMMON PROGRAMMING (KBM.EXE)

COMMAND LISTING IN VIEW MODE

ESC -- quit the keyboard programming program
F1 -- get help on command list
F3 -- enter the configuration screen
F5 -- enter ASCII-code editing mode
F8 -- enter scan-code editing mode
F10 -- quit the keyboard programming program
Ins -- toggle insert/overwrite status for editing (default = insert)
Del -- delete the content of the key where cursor stays
Home -- go to column A of same page same row
End -- go to column I of same page same row
PgUp -- go to one page less in cyclic manner
PgDn -- go to one page next in cyclic manner
Up arrow -- move cursor to one row up in cyclic manner
Down arrow -- move cursor to one row down in cyclic manner
Left arrow -- move cursor to one column left in cyclic manner
Right arrow -- move cursor to one column right in cyclic manner
ENTER -- enter ASCII-code editing mode, but if the last edit of the key was in scan-code mode then this means enter scan-code editing mode.
Alt-A -- enter ASCII-code editing mode
Alt-C -- copy the key content of a key or contents of the keys in a page to buffer
Alt-E – erase the current page or all pages
Alt-G -- enter the configuration page
Alt-L -- load key definitions from a disk file
Alt-M -- enter multi-level shift marker
Alt-N -- enter scan-code editing mode

Alt-O -- load key definitions from a disk file
Alt-P -- paste the buffer content to key definition
Alt-R -- read key definitions from the programmable keyboard
Alt-S -- save key definitions to a disk file
Alt-T – toggle key-content format between page-wise and column-wise
Alt-U -- recover key definition before last change
Alt-W -- write key definitions to the programmable keyboard
Alt-X -- quit the keyboard programming program
any other key stoke -- will be taken as an input in ASCII-code editing mode, and will give no influence if the current key was last edited in scan-code editing mode

COMMAND LISTING IN ASCII-CODE EDITING MODE

ESC -- enter view mode
F1 -- get help on command list of ASCII- code editing mode
F5 -- enter view mode
F8 -- enter view mode
F10 -- enter view mode
BkSp -- delete the character to the left of cursor
Ins -- toggle insert/overwrite status for editing (default = insert)
Del -- delete the character where cursor stays or the last character
Home -- go to first position within the key definition
End -- go to last position within the key definition
PgUp -- go to one page less in cyclic manner
PgDn -- go to one page next in cyclic manner
Up arrow -- move cursor to one row up in cyclic manner and enter view mode
Down arrow -- move cursor to one row down in cyclic manner and enter view mode
Left arrow -- move cursor to one character left within the key definition
Right arrow -- move cursor to one character right within the key definition
Alt-A -- enter view mode
Alt-C -- enter a “Caps Lock” into the key-content
Alt-D -- enter time delay mark into the key-content
Alt-N -- enter view mode

Alt-S -- enter a multi-level separator between definitions of different levels.
Alt-X -- enter view mode
Alt-27 -- enter an "ESC" into the key-content
Alt-8 -- enter a "BkSp" into the key-content
Ctrl-C -- immediately terminates the programming utility.
any other key stoke -- will be taken as an input in ASCII-code editing mode.

COMMAND LISTING IN SCAN-CODE EDITING MODE

ESC -- leading code to enter scan code of any key after it into key-content, except "ESC" + "F" for utility version since 2.15.xx
ESC-F -- leading code of arbitrary release code for utility version since 2.15.xx. Usually used to release "CTL", "ALT" or "SHF".
F1 -- get help on command list of ASCII- code editing mode
F5 -- enter view mode
F8 -- enter view mode
F10 -- enter view mode
BkSp -- delete the character to the left of cursor
Ins -- toggle insert/overwrite status for editing (default = insert)
Del -- delete the character where cursor stays or the last character
Home -- go to first position within the key definition
End -- go to last position within the key definition
PgUp -- go to one page less in cyclic manner
PgDn -- go to one page next in cyclic manner
Up arrow -- move cursor to one row up in cyclic manner and enter view mode
Down arrow -- move cursor to one row down in cyclic manner and enter view mode
Left arrow -- move cursor to one character left within the key definition
Right arrow -- move cursor to one character right within the key definition
Alt-A -- enter view mode
Alt-D -- enter time delay mark into the key-content
Alt-M -- enter a multi-level shift marker into the key-content
Alt-N -- enter view mode
Alt-S -- enter a multi-level separator between definitions of different levels.
Alt-X -- enter view mode

Alt-27 -- work like “ESC” as the leading code for scan codes.
Alt-8 -- enter a “BkSp” into the key-content
Ctrl-C -- immediately terminates the programming utility.
any other displayable key stoke -- will be taken as an input in scan-code format.
any other non-displayable key stroke -- will have no influence

ANSWER BACK CODE

Programming the answer back codes of the 6 position electronic key-lock is also very easy as they are included in the keyboard programming with the locations coded as “KLP”, “KL0”, “KL1”, “KL2”, “KL3” and “KL4” in the key-layout map of page L1. These answer back codes will be issued by the programmable keyboard to PC whenever the 6 position electronic key is switched to a new position (there will be a time delay as determined in the configuration of the keyboard programming utility and is adjustable by “r” and “t” key presses, this time delay is useful to give only the answer back code of the last position of control key when it is turned across multiple positions) or when the keyboard receives an “Enquiry” code (E7h) from the PC or the PST system. Here are some examples of sending this “Enquiry” code to the programmable keyboard in different languages:

Language	**Syntax**
C	outp (0x60, 0xE7)
BASIC	out &H60, &H0E7
DEBUG	o 60 E7

SHORTCUT UTILITY (RWM.EXE)

The feature of this RWM.EXE is designed mainly for the off-line programming purpose and is very useful in quick reproduction of the preprogrammed contents of the programmable keyboard. In such application, the user should have either the preprogrammed keyboard or the preprogrammed file with “.tpl” extension name which is the result of the keyboard programming. The user may use RWM.EXE to directly transfer the programmed result of the programmable keyboard to a “.tpl” file or directly transfer a prestored “.tpl” file to a programmable keyboard without entering the utility “KBM.EXE” which may take more keystrokes. For instance, the

user wants to transfer a file “XXX.tpl”, which was saved before, to the programmable keyboard, he/she should type in following command in subdirectory “POSIFLEX.D”:

RWM XXX.tpl (enter)

This operation is quite recommended to be performed on a daily basis to ensure the system stability.

On the other hand, when the user wants to save the contents of a programmed keyboard, e.g. when he/she newly receives a programmable keyboard, to a file named “YYY.tpl”, he/she should type in following command in subdirectory “POSIFLEX.D”:

RWM -r YYY.tpl (enter)

HARDWARE LIMITATION

In the programmable keyboard, the detection of each key press is achieved through the use of combination of “Logical columns” and “Logical rows”. For any key pressed, the “Logical column” of that key is connected to the “Logical row” of the same key by hardware, the CPU of the programmable keyboard detects such connection and determines that which key has been pressed. However, in the case of multiple simultaneous key-press, there are limitations on the position of the keys selected. The basic rule of such limitations is:

No two keys in the combination are allowed to be in the same “Logical row”.

The reason is that when any two keys of the same “Logical row” are pressed in the same time, then there will be two “Logical columns” connected together through that involved “Logical row”, causing some difficulties by its nature in identifying which key is pressed. To overcome such problem, the output of the programmable keyboard when the above rule is violated could be prohibited.

POWER ON/OFF CONTROL

EXTERNAL POWER SWITCH

This switch is originally an "ON" only power switch. It can be programmed into a power "ON/OFF" switch through software command. To program this switch, the programmer needs to issue the following mentioned commands in the application program to COM1 under the protocol: 9600 bps, parity none, 8 data bits, 1 stop bit.

- **Change to power on only switch –** the command string is <1B> <19> <01> in hexadecimal format. (default status)
- **Change to power on/off switch --** the command string is <1B> <19> <00> in hexadecimal format.

SOFTWARE SWITCH OFF

An easy method for software control to turn the system off is the software off switch. Usually the position LP of the 6 position key switch (or any other key or key combination or any other position of the 6 position key switch as may be preferred) is selected for this purpose.

The hexadecimal command string for software switch off function is : <06> <16> <19> <1D> <n>.

In the above, the "n" indicates the time delay in seconds for actual power off after the command string given to COM1.

The programmer has to program the answer back code of position LP of the programmable keyboard to some command to close the application program (such as "Alt+F4"). At the end of the closing operation, the application program should issue the following mentioned software switch off command string to COM1 under the protocol: 9600 bps, parity none, 8 data bits, 1 stop bit. Or, as an alternative, the programmer may program the answer back code of position LP to contain:

The closing command of the application program;
A certain period of hold on time to allow a safe closing;
The command to call for a program which will send the software switch off command string to COM1 as described.

In other words, the two approaches to utilize the software switch off function are:

The recommended:

Keyboard gives closing command of Application Program

Application Program closes itself and gives switch off command

System turns the power off

The Alternative:

Keyboard gives closing command of Application Program and …

Application Program closes itself

Keyboard gives switch off command at a predefined time

System turns the power off

UPS BATTERY

The optional UPS battery is a maintenance-free lead-acid battery and is targeted to support basically the data preservation and smooth running of the system during intermittent power failure. This battery is not designed for prolonged power support to the system against power shutdown. That means, when the AC power outage is known to last for more than few minutes, it is advisable to turn off the system instead of using the battery up while repeatedly using it up reduces the battery life dramatically.

The battery will undergo self-discharging over time even when not in use. An useful advice to preserve the battery at best condition is to regularly recharge the battery if the battery or the PST system with the battery is put in storage for a period of time. It is recommended to turn on the system to recharge the battery for 1 ~ 2 hours every 3 months of storage if the storage temperature is lower than 30°C. The battery should be recharged for 1 ~ 2 hours every month if the storage temperature exceeds 30°C. However, the user shall avoid the situation with storage temperature over 30°C to protect the life of the battery. Do not connect any other battery to this UPS battery because mixed use of batteries of different capacity, history, or manufacturers may cause damages. In case the user wants to have a longer battery support time during AC power off, he/she should consult his/her dealer for application of an external 12 V battery.

In the PST6000 series products manufactured since year 1999, there is an additional feature for software awareness of UPS status. This “operating on battery” signal can be obtained through checking the communication status of COM1 at signal DCD provided this signal is not engaged elsewhere. When the system is working on AC power, the DCD signal of COM1 is reset. When the system is working on battery power, the DCD signal of COM1 is set. The DCD signal is obtained as the bit 7 (the most significant bit) of the I/O address 3FEh if the COM1 address is set to 3F8h~3FFh (conventional address for COM1) in system configuration.

INTERNAL MODEM CARD

The AFM100 is an ISA bus card with the illustration for the jumper/switch settings printed on the card. In PST6000 series, it is advisable to use the internal modem card as COM3.

To use the internal modem card as COM3, the jumper JP44 on the mainboard must be disconnected to disable the on board COM3. The AFM100 should then be set to COM3 using IRQ9 and I/O address of 3E8h.

For software/driver installation, please refer to relevant documentation for the software applied.

PCMCIA CONTROL CARD

The PST060 is a PnP PCI adapter card. The cardbus controller used on this card is Ricoh RL5C476. For operating systems MSDOS, WINDOWS 95 and WINDOWS NT, the user has to purchase for the driver to install this card into the system from software supplier accessible at web site: *http: //www.systemsoft.com*.

The PnP driver for this card for operating system WINDOWS 98 and onwards is included in the operating system. The installation of this card in such system requires no special effort.

To install this card into WINDOWS95OSR2, the user should do the following:

1. Install the OSR2 without this card.
2. Open “Control Panel” and select “System” icon.
3. Select “Device manager” on “System Properties” dialog box.
4. Expand “System devices” and double click “PCI bus”.

5. Choose “IRQ Steering” and make sure the “Use IRQ Steering” checkbox is checked.
6. Look at the “IRQ Routing Status” text box to make sure IRQ steering is enabled. If not, check the “Get IRQ table from PCI BIOS 2.1 call” checkbox.
7. Click OK and exit Device manager.
8. Go into the INF directory (cd c:\windows\inf). Edit the “pcmcia.inf” file. Look for the Ricoh lines:

```
[Ricoh]
;%PCI\VEN_1180&DEV_0466.DeviceDesc%=CARDBUS, PCI\VEN_1180&DEV_0466
```

9. Remove the semi-colon in front. Change the all “0466” to “0476” like below.

```
;%PCI\VEN_1180&DEV_0476.DeviceDesc%=CARDBUS, PCI\VEN_1180&DEV_0476
```

10. Look for another Ricoh lines:

```
PCI\VEN_1180&DEV_0466.DeviceDesc=“Ricoh RL5C466 CardBus Controller”
```

11. Change all “0466” to “0476” like below and save the file.

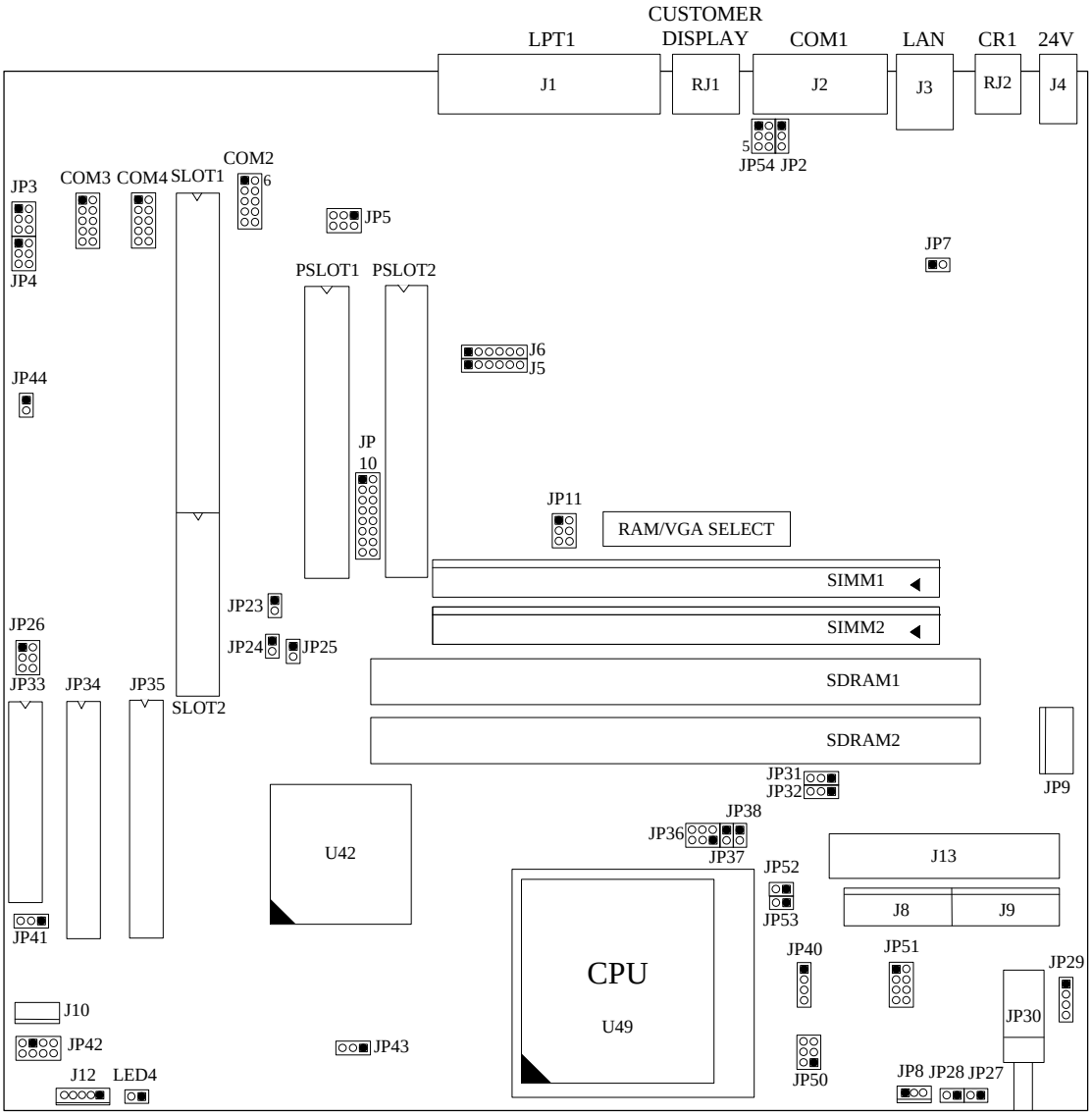
```
PCI\VEN_1180&DEV_0476.DeviceDesc=“Ricoh RL5C476 CardBus Controller”
```

12. Reboot the system with this PCMCIA control card installed inside.
13. Open “Device manager” and expand the PCMCIA class. Make sure it has two instances of Ricoh CardBus controller.
14. Double click one of each instance at a time to make sure the “Disable in this hardware profile” is unchecked.
15. Reboot the system when both instances are enabled.

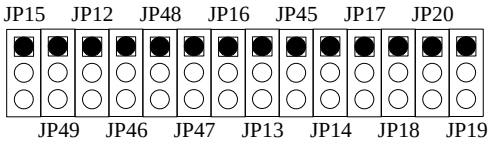
HARDWARE DETAILS

MAIN BOARD (PST980)

PCB LAYOUT



RAM/VGA SELECT AREA DETAIL



JUMPERS AND CONNECTORS

Position	Part Spec	Usage
COM2	HDR 2x5	CONNECTOR FOR COM2 CABLE
COM3	HDR 2x5	CONNECTOR FOR COM3 CABLE
COM4	HDR 2x5	CONNECTOR FOR COM4 CABLE
J1	D SUB 25 F	PRINTER PORT CONNECTOR
J2	D SUB 9 M	COM1 CONNECTOR
J3	RJ45 JACK	LAN CONNECTOR
J4	2.5/5.5 JACK	24V DC OUTPUT
J5	HDR 1x7	CONNECTOR FOR USB 0
J6	HDR 1x7	CONNECTOR FOR USB 1
J8	CONN 6	AT POWER CONNECTOR
J9	CONN 6	AT POWER CONNECTOR
J10	HDR 1x4	KB CONNECTOR
J12	MINI 5	IRDA CONNECTOR
J13	CONN 2x10	ATX POWER
JP2	HDR 1x3	COM1 DC SUPPLY SELECT
JP3	HDR 2x3	COM3 DC SUPPLY SELECT
JP4	HDR 2x3	COM4 DC SUPPLY SELECT
JP5	HDR 2x3	COM2 DC SUPPLY SELECT
JP7	HDR 1x2	DRAWER OPEN INDICATOR
JP8	HDR 1x3	CONNECTOR FOR POWER CONTROL
JP9	CONN 4	BATTERY INPUT CONNECTOR
JP10	HDR 2x8	INTERNAL VGA CONNECTOR
JP11	HDR 2x3	CPU/PCI CLOCK SELECT
JP12	HDR 1x3	DRAM BANK0 SELECT

Position	Part Spec	Usage
JP13	HDR 1x3	DRAM BANK0 SELECT
JP14	HDR 1x3	DRAM BANK0 SELECT
JP15	HDR 1x3	DRAM BANK0 SELECT
JP16	HDR 1x3	DRAM BANK0 SELECT
JP17	HDR 1x3	INTERNAL VGA SELECT
JP18	HDR 1x3	INTERNAL VGA ID SELECT
JP19	HDR 1x3	INTERNAL VGA SELECT
JP20	HDR 1x3	INTERNAL VGA SELECT
JP23	HDR 1x2	RESERVED
JP24	HDR 1x2	RESERVED
JP25	HDR 1x2	INTERNAL VGA SELECT
JP26	HDR 2x3	IDE1 LED:3-4; IDE2 LED:5-6
JP27	HDR 1x2	STB LED
JP28	HDR 1x2	ON/OFF SWITCH
JP29	HDR 1x4	SPEAKER 1:12V; 2/3:NC; 4:GND
JP30	SWITCH	ON SWITCH
JP31	HDR 1x3	DIMM SOCKET VOLTAGE SELECT
JP32	HDR 1x3	DIMM SOCKET VOLTAGE SELECT
JP33	HDR 2x17	FDD CONNECTOR
JP34	HDR 2x20	HDD SECONDARY IDE CONNECTOR
JP35	HDR 2x20	HDD PRIMARY IDE CONNECTOR
JP36	HDR 2x3	CLOCK RATIO SELECT
JP37	HDR 1x2	CPU TYPE SELECT (P55CT enable)
JP38	HDR 1x2	CPU TYPE SELECT (P55CT enable)
JP40	HDR 1x4	POWER FOR FAN
JP41	HDR 1x3	CMOS MEMORY
JP42	HDR 2x4	CONNECTOR FOR PS/2 MOUSE
JP43	HDR 1x3	CACHE SIZE: SELECT
JP44	HDR 1x2	COM3 ENABLE
JP45	HDR 1x3	DRAM BANK0 SELECT
JP46	HDR 1x3	DRAM BANK0 SELECT

Position	Part Spec	Usage
JP47	HDR 1x3	DRAM BANK0 SELECT
JP48	HDR 1x3	DRAM BANK0 SELECT
JP49	HDR 1x3	DRAM BANK0 SELECT
JP50	HDR 2x3	CPU TYPE SELECT (separate V_{CORE} & V_{IO})
JP51	HDR 2x4	CPU V_{CORE} ADJUST
JP52	HDR 1x2	CPU TYPE SELECT (set V_{IO})
JP53	HDR 1x2	CPU TYPE SELECT (set V_{IO})
JP54	HDR 2x3	CUSTOMER DISPLAY HANDSHAKING SELECT
PSLOT1	SLOT 128	PCI SLOT
PSLOT2	SLOT 128	PCI SLOT
RJ1	10 PIN JACK	VFD CONNECTOR
RJ2	RJ11 JACK	CR CONNECTOR
SDRAM1	SOCKET-168	DIMM SOCKET BANK0 or BANK2
SDRAM2	SOCKET-168	DIMM SOCKET BANK1
SIMM1	SOCKET 72	SIMM SOCKET BANK0
SIMM2	SOCKET 72	SIMM SOCKET BANK0
SLOT1+2	SLOT 98	ISA SLOT
U49	SOCKET 7	CPU SOCKET

JUMPER SETTINGS

The "★" marks in the following tables denote the factory default settings.

CPU TYPE SELECT

CPU TYPE / JUMPERS	NON-MMX	MMX
JP37	Open ★	Short
JP38	Open ★	Short
JP50	1 – 3, 2 – 4 short ★	All Open
JP51	Default 3.3 V ★	Set to 2.8 V
JP52	Open ★	Short
JP53	Open ★	Short

CPU V_{CORE} ADJUST

JP51 STATUS	V_{CORE} for CPU
All Open	2.0 V
1 – 2 short	2.1 V
3 – 4 short	2.2 V
1 – 2, 3 – 4 short	2.3 V
5 – 6 short	2.4 V
1 – 2, 5 – 6 short	2.5 V
3 – 4, 5 – 6 short	2.6 V
1 - 2, 3 – 4, 5 – 6 short	2.7 V
7 – 8 short	2.8 V
1 – 2, 7 – 8 short	2.9 V
3 – 4, 7 – 8 short	3.0 V
1 – 2, 3 – 4, 7 – 8 short	3.1 V
5 – 6, 7 – 8 short	3.2 V
1 – 2, 5 – 6, 7 – 8 short	3.3 V ★(for non-MMX CPU)
3 – 4, 5 – 6, 7 – 8 short	3.4 V
1 – 2, 3 – 4, 5 – 6, 7 – 8 short	3.5 V

CPU/PCI CLOCK SELECT

JP11 STATUS	CPU CLOCK	PCI CLOCK
1 – 2, 3 – 4 short	55 MHz	27.5 MHz
1 – 2 short	60 MHz	30 MHz
All Open	66.8 MHz	33.4 MHz
3 – 4 short	75 MHz	37.5 MHz

CLOCK RATIO SELECT

CPU TYPE / JP36 STATUS	P54C	P55C	AMD-K6
All Open	1.5	3.5	3.5
1 – 2 short	2.0	2.0	2.0
1 – 2, 3 – 4 short	2.5	2.5	2.5
3 – 4 short	3.0	3.0	3.0
1 – 2, 5 – 6 short	N. A.	N. A.	4.0
1 – 2, 3 – 4, 5 – 6 short	N. A.	N. A.	4.5
3 – 4, 5 – 6 short	N. A.	N. A.	5.0
5 – 6 short	N. A.	N. A.	5.5

EXAMPLE CPU JUMPER SETTINGS

JUMPER / CPU	JP11	JP36	JP37	JP38	JP50	JP51	JP52	JP53
Pentium-100	Open	Open	Open	Open	1-3,2-4	1-2,5-6.7-8	Open	Open
Pentium-133	Open	1-2	Open	Open	1-3,2-4	1-2,5-6.7-8	Open	Open
Pentium-166	Open	1-2,3-4	Open	Open	1-3,2-4	1-2,5-6.7-8	Open	Open
Pentium-200	Open	3-4	Open	Open	1-3,2-4	1-2,5-6.7-8	Open	Open
MMX-166	Open	1-2,3-4	Short	Short	Open	7-8	Short	Short
MMX-200	Open	3-4	Short	Short	Open	7-8	Short	Short
MMX-233	Open	Open	Short	Short	Open	7-8	Short	Short

DRAM BANK SELECT

BANK0 SET TO / JUMPERS	SDRAM1	SIMM1+SIMM2
JP15	1 – 2 short ★	All Open
JP49	1 – 2 short ★	2 – 3 short
JP12	1 – 2 short ★	All Open
JP46	2 – 3 short ★	1 – 2 short
JP48	2 – 3 short ★	1 – 2 short
JP47	2 – 3 short ★	1 – 2 short
JP16	1 – 2 short ★	All Open
JP13	1 – 2 short ★	All Open
JP45	2 – 3 short ★	1 – 2 short
JP14	1 – 2 short ★	All Open

ACCEPTABLE DRAM CONFIGURATIONS

DRAM IN SOCKET	ACCEPTABLE CONFIGURATIONS IN COLUMNS					
	(WHEN BANK0 SET AT) SDRAM1				SIMM1 + SIMM2	
SDRAM1	✓	✓	✓	✓		
SDRAM2		✓		✓		✓
SIMM1			✓	✓	✓	✓
SIMM2			✓	✓	✓	✓

DIMM SOCKET VOLTAGE SELECT

JP31 STATUS	JP32 STATUS	VOLTAGE FOR SDRAM1 & SDRAM2
1 – 2 short	1 – 2 short	5 V (for 5 V EDO DRAM DIMM module)
2 – 3 short ★	2 – 3 short ★	3.3 V (for 3.3 V EDO DRAM or SDRAM DIMM module) ★

CACHE SIZE SELECT

JP43 STATUS		CACHE SIZE	
1 – 2 short	★	256 KB	★
2 – 3 short		512 KB	

INTERNAL VGA SELECT

Internal VGA / JUMPERS	Disable	Enable	
JP17	1 – 2 short	2 – 3 short	★
JP19	2 –3 short	1 –2 short	★
JP20	2 – 3 short	1 –2 short	★
JP25	Short	Open	★

INTERNAL VGA ID SELECT

JP18 STATUS		PCI IDSEL (Factory Setting Not For Change)	
1 – 2 short		AD30 (Alternative)	
2 – 3 short	★	AD31 (Factory Setting)	★

CMOS MEMORY SELECT

JP41 STATUS		CMOS MEMORY	
1 – 2 short	★	MEM (Normal)	★
2 – 3 short		CLEAR	

CUSTOMER DISPLAY HANDSHAKING SELECT

JP54 STATUS		HANDSHAKING SIGNAL	
1 – 2, 3 – 5, 4 - 6 short		DSR of COM1	
1 – 3, 2 – 4, 5 - 6 short	★	CTS of COM1	★

This jumper is introduced on the main board bearing version number as PST980D for system version C in 2nd quarter of year 1998. The hardware handshaking signal for the customer display should be selected according to the application program used. The default is to use CTS.

COM1 DC SUPPLY SELECT

JP2 STATUS	COM1 PIN9
1 – 2 short	Connected to 5 V
2 – 3 short ★	Connected as RI ★

COM2 DC SUPPLY SELECT

JP5 STATUS	COM2 PIN1	COM2 PIN9
1 – 3, 2 -4 short	Connected to 12 V	Connected to 5 V
1 – 3, 4 - 6 short	Connected as DCD	Connected to 5 V
3 – 5, 2 - 4 short	Connected to 12 V	Connected as RI
3 – 5, 4 - 6 short ★	Connected as DCD ★	Connected as RI ★

COM3 DC SUPPLY SELECT

JP3 STATUS	COM3 PIN1	COM3 PIN9
1 – 3, 2 -4 short	Connected to 12 V	Connected to 5 V
1 – 3, 4 - 6 short	Connected as DCD	Connected to 5 V
3 – 5, 2 - 4 short	Connected to 12 V	Connected as RI
3 – 5, 4 - 6 short ★	Connected as DCD ★	Connected as RI ★

COM4 DC SUPPLY SELECT

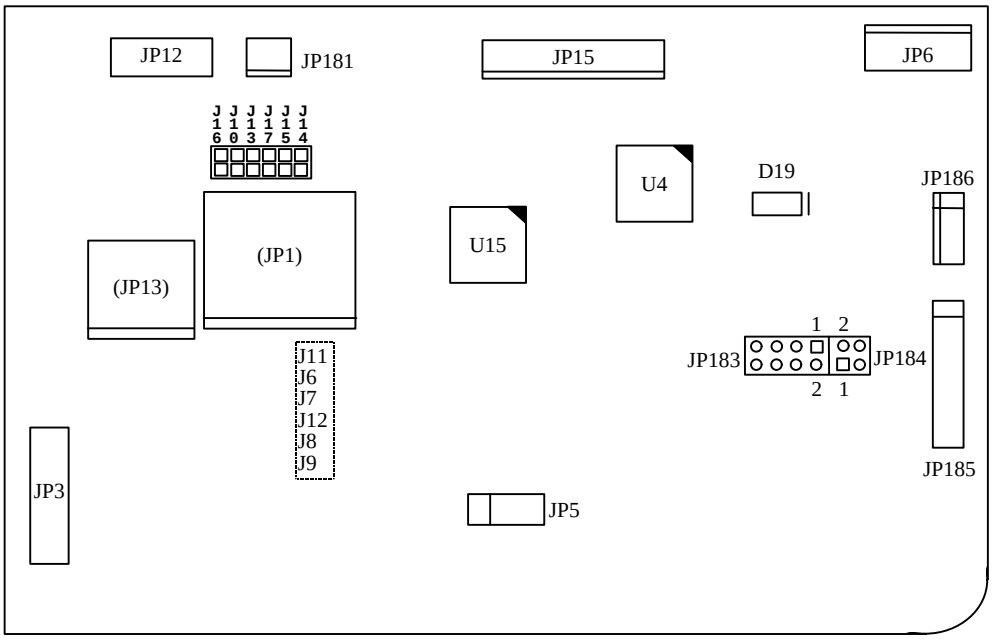
JP4 STATUS	COM4 PIN1	COM4 PIN9
1 – 3, 2 -4 short	Connected to 12 V	Connected to 5 V
1 – 3, 4 - 6 short	Connected as DCD	Connected to 5 V
3 – 5, 2 - 4 short	Connected to 12 V	Connected as RI
3 – 5, 4 - 6 short ★	Connected as DCD ★	Connected as RI ★

COM3 ENABLE

JP44 STATUS	COM3 PORT
Short	Enabled
Open	Disabled

PROGRAMMABLE KEYBOARD

CONTROL BOARD LAYOUT



CONNECTORS

Connector	Connect to
JP 1	PC AT keyboard
JP 3	6 position electronic key-lock
JP 6	Membrane through the narrow tongue
JP 12	I/O connection (N/A in PST systems)
JP 13	PS/2 keyboard
JP 15	Membrane through the broad tongue
JP 181	Power LED
JP 185	MSR head
JP 186	MSR LED

JUMPER SETTINGS

Jumper	Function	When shorted	When opened
J 13	Send code in	scan code	ASCII by Alt + Num ★
J 14	ISO Track 1 of MSR	enabled ★	disabled
J 15	ISO Track 2 of MSR	enabled ★	disabled
J 16	ISO Track 3 of MSR	enabled ★	disabled
J 17	Leading/Stop sentinel	disabled	enabled ★

The ★ mark means the default setting for the above items.

The Alt + Num function is very important for some non-English language application. The default setup of PST systems manufactured since 1997 is to enable the Alt + Num function, while the default setup of PST systems manufactured in 1996 was to disable the Alt + Num function. For the English application, the user may disable the Alt + Num function to improve the performance.

The start/end sentinel is defined by ISO7811: For track 1, start sentinel is "%" and end sentinel is "?". For tracks 2 and 3, start sentinel is ";" and end sentinel is "?".

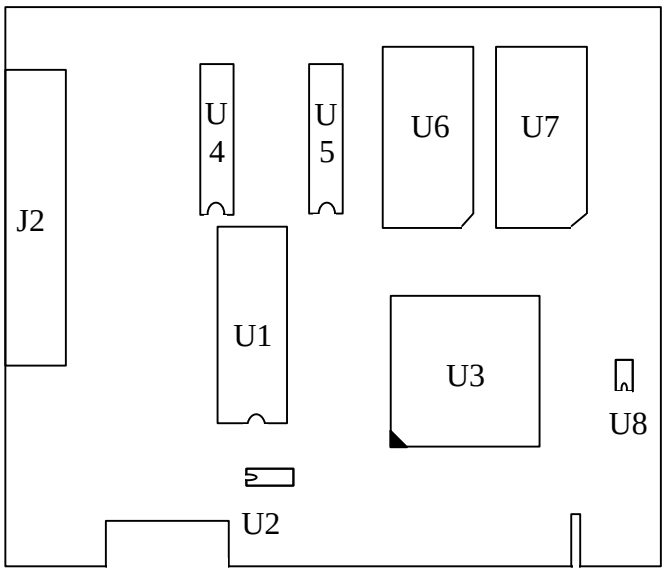
MODIFICATION FOR MSR

Adding an ISO MSR

- Assemble the MSR head and connect it to JP 185.
- Assemble the bi-color LED and connect it to JP 186.
- Check the jumper settings of J17:

  Short: Start/end sentinel OFF Open: Start/end sentinel ON ★

LCD CARD (PST033)



The PST033 is the adapter card that supports the 12.1” LCD display for the LCD type PST systems. This card automatically disables the on board VGA port. The DC power supply to the LCD panel is included in the 50 pin SCSI type connector J2. This connector is designed for the Posiflex 12.1” LCD only and should never be connected to any other device otherwise short circuit damage could happen.

This card does not include the cable for COM2 port. So, at replacement, the cable CCBLA-227 should be screwed below the LCD connector J2.

SERVICE AND SPARE PARTS

SERVICE GUIDE

OPENING THE KEYBOARD

Whenever there comes to a need for service or maintenance or upgrading, there may be the need for opening the PST system and having an access to the interior of the cabinet. The method to access the interior of a PST system can be divided into following steps: removing the exterior peripherals, opening the programmable keyboard, detaching the rear cabinet and dissociating the required parts/module from the chassis.

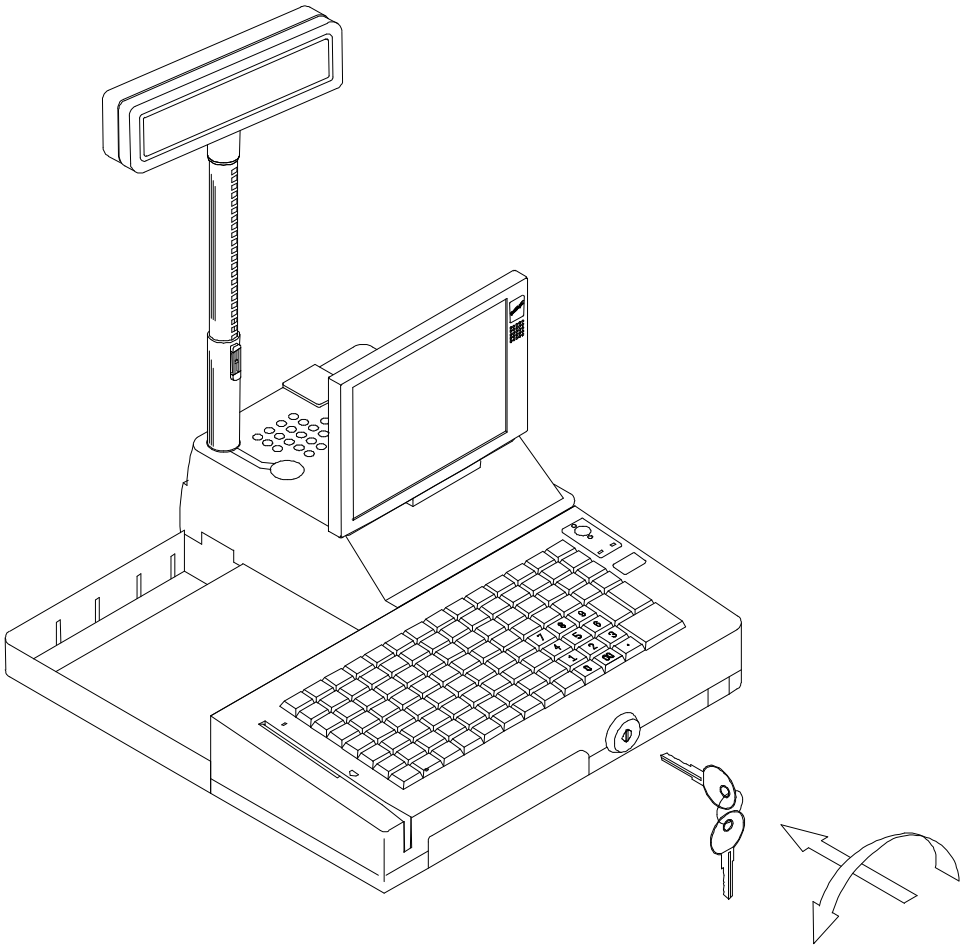
The possible exterior peripherals attached to the PST system may include external KB wedge device, printer, CRT or LCD display, VFD customer display and some devices connected to the I/O ports of PST system such as cash drawers, laser scanning devices etc..

Before breaking or making any connection or opening any device or the PST system, please always make certain that all the power for each and every device involved are turned off and the power cords are removed.

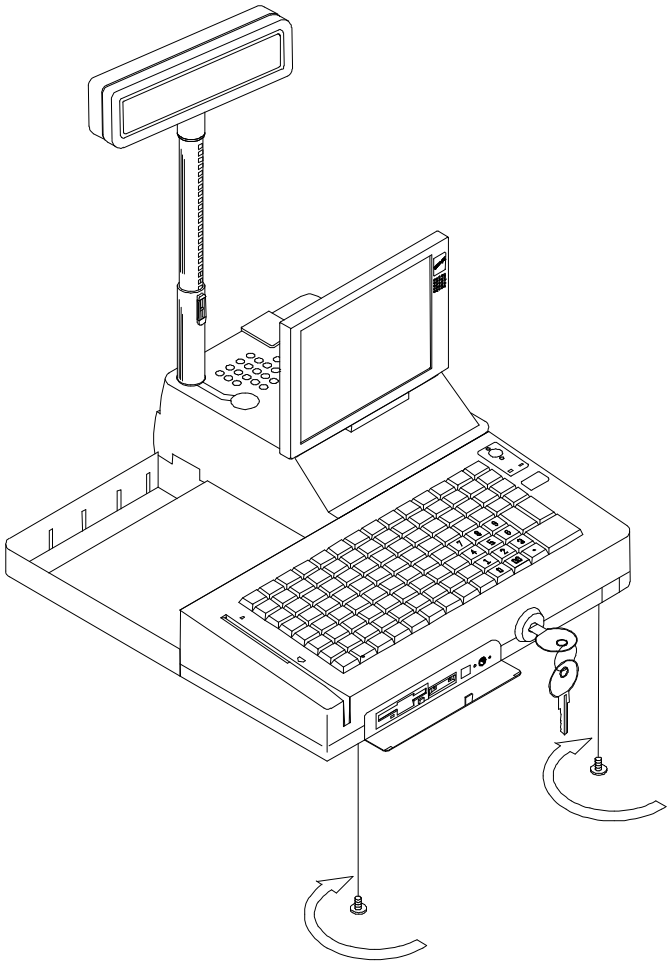
Should there be any device connected to the area inside the front door such as a KB wedge device or a PC keyboard, all these devices should be disconnected from the PST system first. Use the mechanical key to open the front door (see DWG.-1). If this key is lost somehow, the user should request for replacement of the same code of the mechanical lock. The numerical code of the mechanical lock is printed on a label stuck at the bottom side of PST near the front door area. The user should provide this number to get a right key. Unscrew two screws at the bottom side of PST near the front bottom corners (see DWG.-2) and the user may now lift the programmable keyboard unit by the front bottom edge of the keyboard unit as shown in the following drawing DWG.-3 on page 7 - 4.

There are three cables to be disconnected from the keyboard unit before the unit can be completely taken away from the major part of PST system. The user should disconnect the cable coming from the external keyboard connector or through

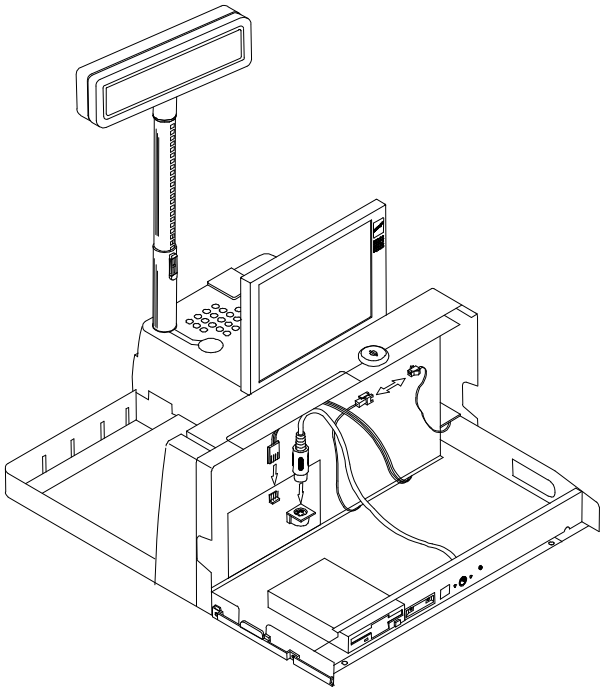
an intermediate cable of the internally connected KB wedge device if assembled in accordance with the instructions given in the User's Manual; a four wire cable connecting to the KB CPU board from somewhere near the power supply unit; an intermediate socket connecting to the LED on the programmable keyboard unit. Then the keyboard unit can be taken away and put aside. However, to prevent a messy situation for reinstallation later on, the two (or one if an internally connected KB wedge device exists) cable stopper from both sides of the bottom chassis should be taken out and kept well (see DWG.-4).



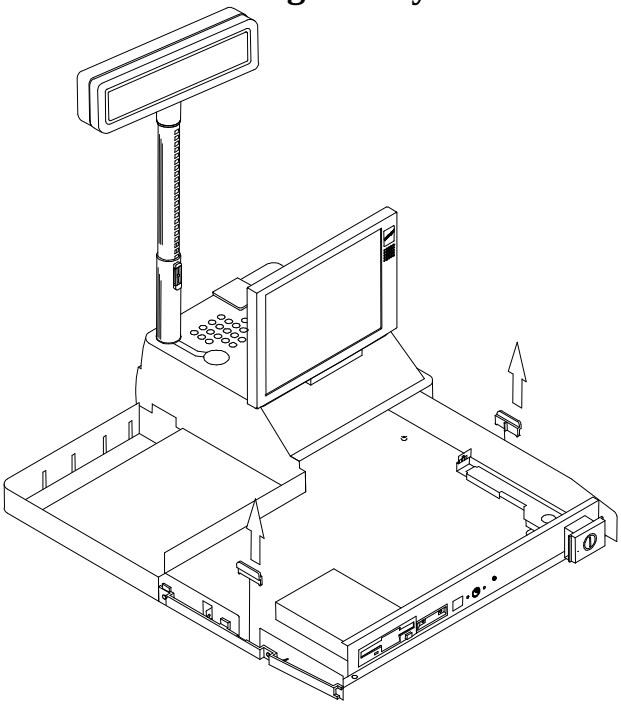
DWG. - 1 Unlocking front door



DWG. - 2 Unscrew the bottom



DWG. - 3 Lifting the keyboard unit



DWG. - 4 Taking the cable stoppers out

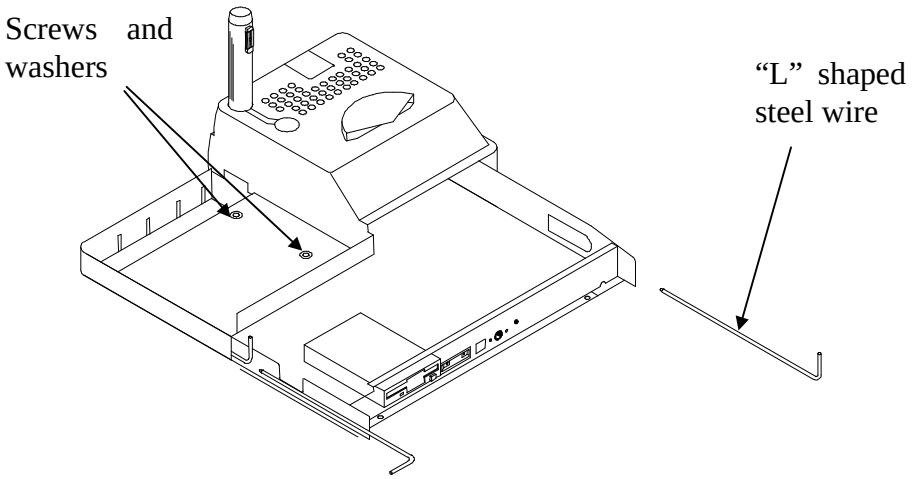
DETACHING THE REAR CABINET

Before detaching the rear cabinet of the PST system, all the external devices should be removed. Disconnect all the connectors in the rear room within back cover. Refer to the installation instructions in User's Manual (take opposite operation in reverse order) for detaching CRT or LCD display, printer, VFD and if installed, the built-in battery.

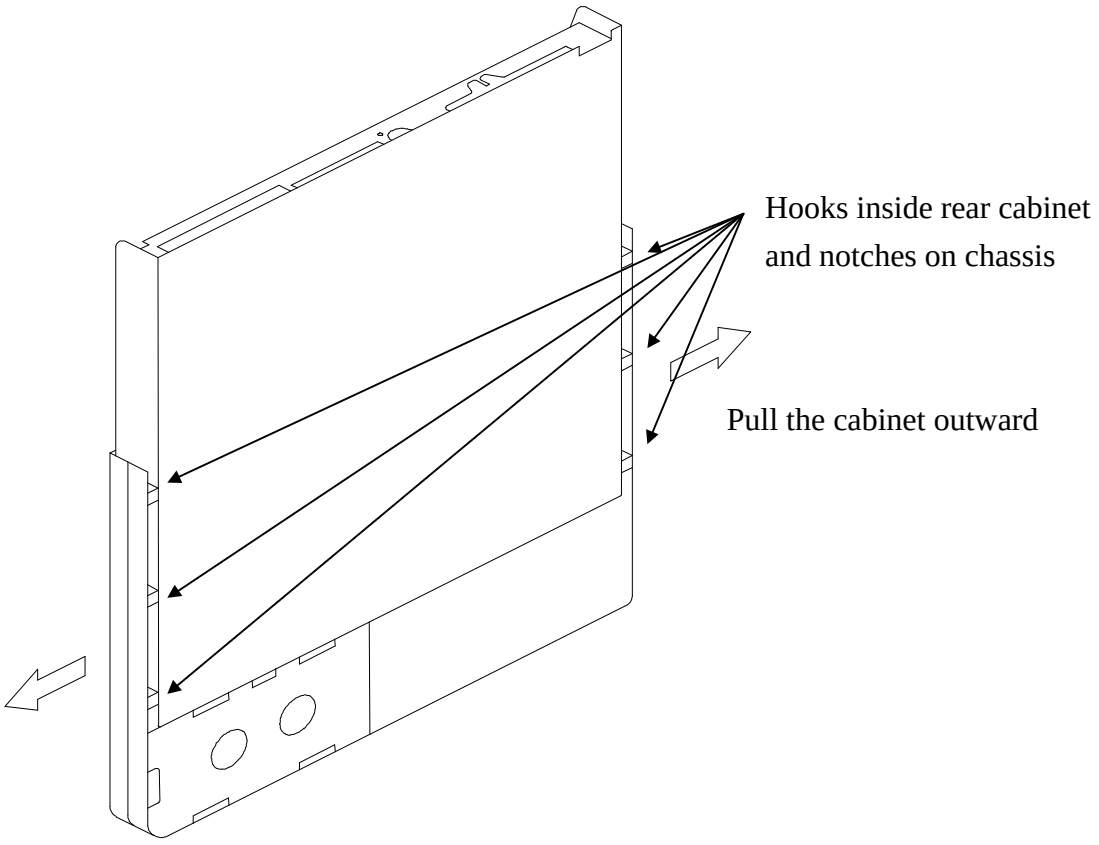
Look into both sides of the PST chassis, with reference to the following drawing, the user should find a "L" shaped steel wire at each side binding the rear cabinet to the bottom chassis. Of course, only the short arm of the wire is visible from the side that was covered by the side wall of the keyboard unit just removed. Turn the short arms outward by 90 degrees (they were pointing upward) and pull the wires toward the front till the long arms come out (see DWG.-5). Unscrew the two screws and take out the washers on the printer platform to get ready to take the rear cabinet off.

Now, the user would like it better to do the next operation with the PST system up side down, though it is still possible for some skillful person to do it without turning the PST. The drawing shows the bottom side of the PST system. The purpose is to detach all the hooks from their notches. There are three notches on each side wall of the bottom chassis and there are correspondingly three hooks at the inside of each side wall of the rear cabinet. The key issue is to detach the hooks by pulling the side walls of the rear cabinet a little bit outward yet still within the limit of the elasticity of the cabinet (see DWG.-6). It is normal to have the rearmost pair of hooks more difficult to get out than the others in this operation. Then the cabinet can be put aside and the PST turned back to normal position.

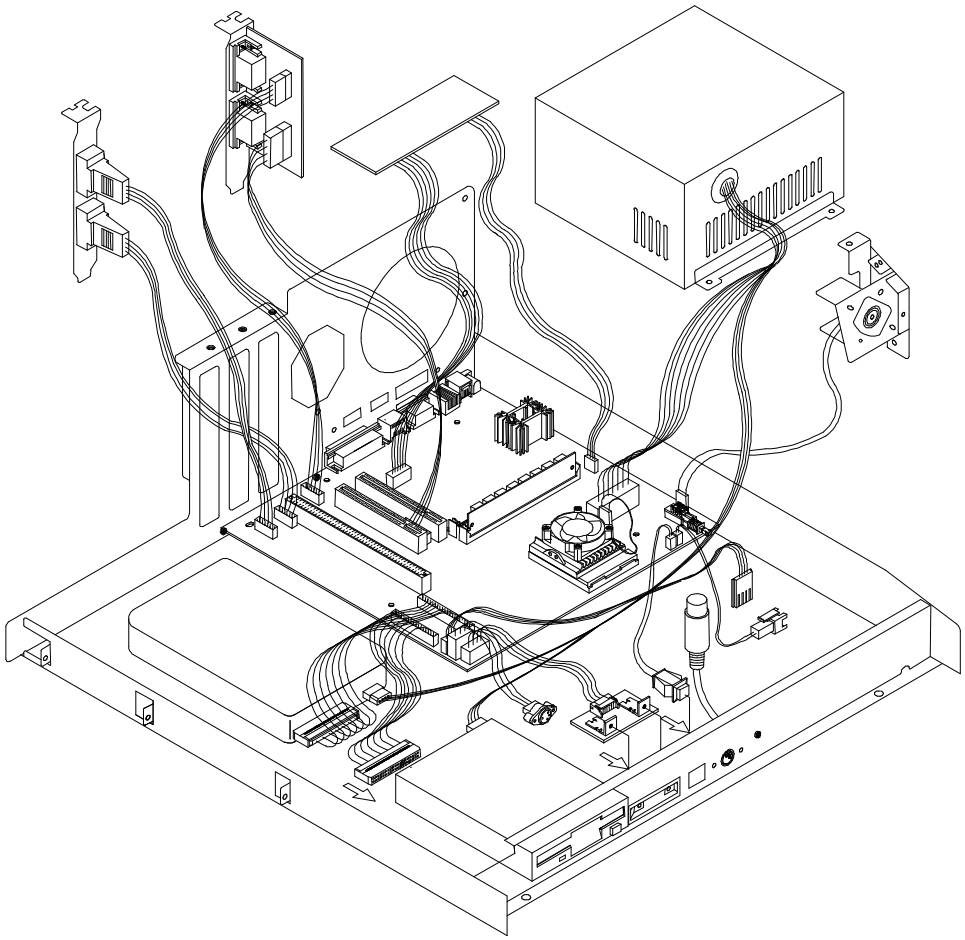
Refer to the drawing for cable connections within the PST system and disconnect those necessary for taking out the module that needs to be replaced (see DWG.-7).



DWG. - 5 Turning the "L" shaped wire outward and pull out



DWG. - 6 Detaching hooks from notches



DWG. - 7 Cable connections inside PST system

SPARE PARTS/MODULE LIST

At the last page of this chapter, the assembly drawing of the PST6000 series must have provided the reader of the Technical Manual an idea of the way to access each parts or module for service or upgrading purposes as required in the previous chapter(s). Every parts/module identifiable in the drawing are listed below, please note that all available choices of each location are listed to cover the whole product range of PST6000 series and parts at some location could be a subset of some module at other location (e.g. item XXXX is contained in item YYYY).

Item	Part Number	Description
1010	PST9MVPWAU01N	9” DC monitor, northern hemisphere
1011	PST9MVPWAU01S	9” DC monitor, southern hemisphere
1012	AMT10C26TV02N	10” color monitor, northern hemisphere
1013	AMT10C26TV02S	10” color monitor, southern hemisphere
1020	PST9BASEMSM	Monitor swivel base mechanism
1030	PST12”LCD	12.1” color LCD DSTN
1040	PSTCVRCRT	Rear cabinet, CRT type w/o pole base
1041	PSTCVRLCD	Rear cabinet, LCD type w/o pole base
1050	PSTCRTCBLCVR	CRT cable cover
1060	PSTCRTRODCVR	LCD cable cover, round shape
1061	PSTCRTLWROD	Pole base long type
1070	PSTBTRYCVR	Battery cover
1080	PD2101	Customer display 2 x 20 VFD
1081	PD7001	Customer display graphic LCD (English)
1082	PD7011	Customer display graphic LCD (GB Chn)
1083	PD7021	Customer display graphic LCD (Big 5)
1090	PSTBKDRLH	Back door with latch
1100	CBT12VLA	12V 2.3AH UPS Battery
1110	ASPOP200W TE006	ATX Power supply
1120	PSTBKCHASS	Back plastic chassis

(continued 1)

Item	Part Number	Description
1130	PST053	I/O card for COM2 & VGA
1131	PST033	LCD card w/o COM2
1140	CCBLA-210	COM2 cable to PST053
1150	CCBLA-234	VGA cable to PST053
1160	CCBLA-227	I/O cable for COM2 (to match PST033)
1170	CCBLA-227B	I/O cable with plate(COM3, COM4)
1180	A389-4	4MB SIMM module EDO DRAM
1181	A389-8	8MB SIMM module EDO DRAM
1182	A389-16	16MB SIMM module EDO DRAM
1190	A390-16	16MB DIMM module EDO DRAM
1191	A390-32	32MB DIMM module SDRAM
1192	A390-64	64MB DIMM module SDRAM
1200	HCT-50TC-6	Cooling fan with heat sink
1210	CIC80586-100	CPU Pentium -100
1211	CIC80586-133	CPU Pentium -133
1212	CIC80586-166	CPU Pentium -166
1213	CIC80586-200	CPU Pentium -200
1214	CIC80586-233	CPU Pentium -233
1220	PST980D	Pentium system board module
1230	AHDD1.2GSEA	HDD 1.2 GB
1231	AHDD2.1GQTM	HDD 2.1 GB
1240	CCBLA-148B	HDD cable
1250	CCBLA-149B	FDD cable
1260	PSTEXTCLASTP	Left/Right cable stopper
1270	PSTSPACR-L	Left plastic bracket
1280	AFDD1.4MTEIV	FDD 1.44MB
1290	CCBLA-244	IRDA cable
1300	PST055A	IRDA transceiver
1310	CCBLA-147A	External KB cable connector assembly to KB controller

(continued 2)

Item	Part Number	Description
1320	CCBLA-233	PS/2 mouse connector cable
1330	PSTMAINCHASSY	Chassis kit
1340	PSTLCKROD	L-shape locking stick
1350	PSTSPACR-R	Right plastic bracket
1360	PSTSWLEVELA	Power switch level with adapter & knob
1370	PSTSWBRKT	Power switch level cover
1380	CCBLA-231-1	USB cable
1390	CCBLA-230	UPS battery cable
1400	PST054A6K	UPS and USB battery connector board
1410	PSTSPKASSY	Speaker with bracket
1420	PSTCHASSISEMI	PST EMI kit (must be with item 1040 or 1041
1430	CCBLA-152	MSR LED, (Dual color) with cable
1440	PSTKEYPAIR	Single key top & key cap pair
1441	PSTDBKEYPAIR	Double key top & key cap pair
1442	PSTQDKEYPAIR	Quad key top & key cap pair
1443	BK-2000	Blank key
1444	TK-2000	Ten key set
1450	CCBLA-167-2	Stand by LED, (Yellow) with cable
1460	PSTKB112	Stroke type keyboard w/o MSR
1461	PSTKB112MR2	Stroke type keyboard with 2 track MSR
1462	PSTKB112MR3	Stroke type keyboard with 3 track MSR
1463	PSTKB112MRJS2	Stroke type keyboard with JIS II MSR
1470	PSTKB112EKEY	4 Keys set for 6 position key lock
1480	PSTKBELCK6PASY	6 Position key lock with wafer assembly
1490	CCBLA-151	Power LED, (Green) with cable
1500	PSTKBMECHKEY	Keyboard front door key
1510	PSTKBDR-1	Keyboard front door
1520	CCBLA-150C	Internal KB cable from system board to KB controller
1530	PSTKB112CPUMR	Keyboard controller

(continued 3)

Item	Part Number	Description
1540	CMSRCATRIGE-2	MSR module 2 tracks
1541	CMSRCATRIGE-3	MSR module 3 tracks
1542	CMSRCATRIGE-4A	MSR module JIS II

ASSEMBLY DRAWING